Saskatchewan Comparable Health Indicators Report

Saskatchewan
Health

September 2002

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A Message from the Minister of Health

I am pleased to present the *Saskatchewan Comparable Health Indicators Report*, an illustration of our province's commitment to provide regular and comprehensive reporting on health programs and services.

This report was commissioned by Canada's First Ministers in September 2000, in recognition of the importance of evidence-based research in guiding the allocation of resources in the health sector. All provinces and territories have released similar reports as part of this national initiative, and have pledged to provide further data in 2004.

The Action Plan for Saskatchewan Health Care has directed our government to move toward greater accountability. This report reflects that effort, as we strive to offer the best possible health care to the people of Saskatchewan.

John T. Nilson

John T. Nilson, Q.C.
Minister of Health

A Message from the Deputy Minister of Health

Saskatchewan Health recognizes the value of research in assessing the performance of our health system. While the majority of our health resources are devoted to organizing and delivering services, we must also concentrate on identifying priorities and measuring results.

The *Saskatchewan Comparable Health Indicators Report* represents many hours of work by dedicated Saskatchewan Health staff. It also represents our efforts to ensure that Saskatchewan people receive quality service and value for their health care dollars.

We will continue to work towards those goals, and to use sound research and data as we evaluate and direct our health care system.

GYeates

Glenda Yeates
Deputy Minister of Health

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EXECUTIVE SUMMARY

Introduction

The Saskatchewan Comparable Health Indicators Report contains sixty-one (61) measures that together tell a story about the health of Saskatchewan residents and selected health services in the province. The report provides a wealth of information which will assist individuals to assess how we are doing in the areas of health status, personal health practices, public health activities, selected diseases and conditions and in the provision of selected health services.

The report is an important first step in public reporting for purposes of accountability and begins to move us away from measuring performance based primarily on input and output measures (e.g. number of physicians and nurses, dollars spent, surgeries performed). This first Comparable Health Indicators Report still contains some input and output measures, since this is the form most of our information collection takes. The current report must therefore be considered a work in progress. Future iterations of the report will build on the current work and move toward an improved performance measurement framework as well as improved measures.

The work was initiated by a September 2000 commitment by First Ministers to provide comprehensive and regular public reporting on health, using jointly-agreed upon comparable indicators of health status, health outcomes and quality of service.

Given the number of mandatory measures and the common reporting requirements this report is very long and technical. The report tells a complex and at times contradictory story. For example, when compared to other jurisdictions and the national average, Saskatchewan rates favourably on some measures and less favourably on others. In other words the Saskatchewan population and Saskatchewan health services fair favourably on some measures and not so well based on others.

Improved reporting on health system performance is one of the key goals in producing this report. The report is very useful in this regard, however, a note of caution is worth adding: due to the complexity of selected measures, the technical nature of the reporting requirements and the sheer volume of the report the benefits of public reporting may be only partially met in the first comparable health indicators report. To make the report more accessible and useable it has been organized around several major themes. In addition, technical specifications, notes on confidence intervals and notes on interpretation have been place in appendices at the end of the report. As much as possible, the indicators are left to speak for themselves.

The report is organized around five chapters each telling a story about the health of Saskatchewan residents and about selected health services: A Story about Health Status

(Chapter 1); A Story about Personal Health Practices (Chapter 2); A Story about Public Health (Chapter 3); A Story about Select Diseases (Chapter 4); and, A Story about Health Service Provision (Chapter 5).

A Story about Health Status

Health status is often measured from a medical point of view, by assessing pathological conditions or health problems often using administrative information from hospitals and physicians. Health status can also be measured by surveying individuals' perceptions of how they feel about their health. The indicators analyzed in this chapter include both objective measures of ill health and subjective measures of health status. These indicators include:

- Self Reported Health Status
- Life expectancy
- Disability Free Life Expectancy
- Low Birth Weight
- Infant Mortality

For Saskatchewan these indicators represent good news and bad news. We compare favourably to other provinces in life expectancy and disability free life expectancy. However, we do not fare as well on self-rated health status or infant mortality. A closer review of all of these indicators can be found in the main body of the report. Two indicators, life expectancy and infant mortality, are examined in more detail below.

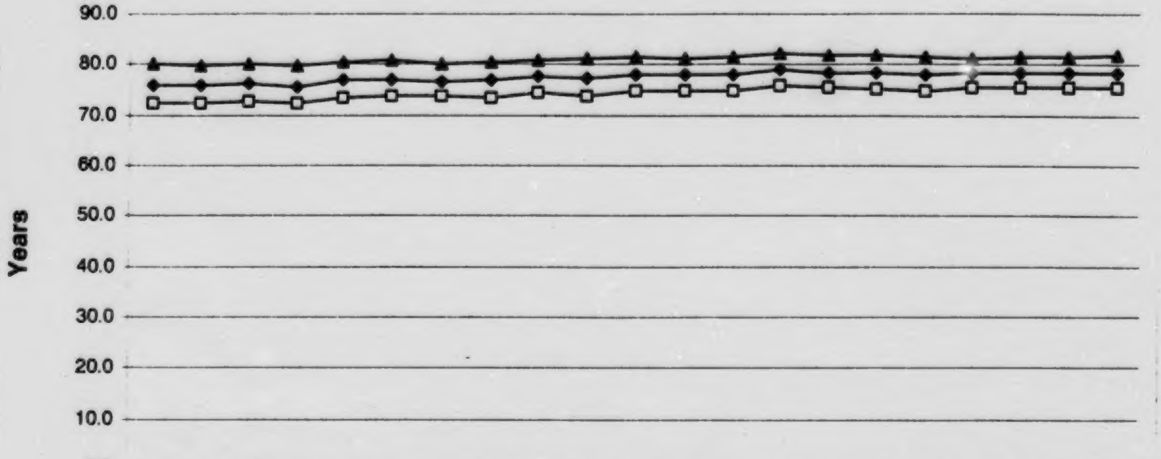
Life expectancy

Life expectancy is a basic, reliable indicator of the overall health of a population. This widely used measure is an internationally accepted measure of health status and allows for accurate comparisons over time and between jurisdictions.

However, such measures have limitations. While life expectancy at birth and at age 65 are consistent and comparable measures over time, they will not vary much in response to events or health system changes. Furthermore, life expectancy as a global health status measure depends on many circumstances beyond the performance of the health system and the appropriateness of health services. This indicator also tells us little about "quality" of life, such as how disability or limitation of activity affects people's lives.

Between 1979 and 1999 in Saskatchewan, life expectancy at birth, and at age 65, increased. Life expectancy at birth increased 2.5 years to 78.5 years and life expectancy at age 65 increased by 0.6 years to 18.6 years in 1999. In other words a newborn in Saskatchewan can expect to live 78.5 years and a person residing in the province who reaches the age of 65 can expect to live, on average, another 18.6 years to 83.6 years of age.

Saskatchewan life expectancy at birth, 1979-1999



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Both	76.0	75.9	76.3	75.7	76.9	77.1	76.7	76.9	77.5	77.3	78.0	78.0	78.1	78.9	78.5	78.4	78.1	78.3	78.5	78.5	78.5
□ Males	72.5	72.5	72.8	72.3	73.5	73.8	73.6	73.5	74.4	73.9	74.7	74.9	75.0	75.9	75.4	75.1	74.9	75.4	75.7	75.5	75.4
▲ Females	80.0	79.9	80.2	79.6	80.6	80.8	80.2	80.6	80.8	81.1	81.6	81.2	81.4	82.1	81.8	81.8	81.5	81.3	81.4	81.6	81.8

Source: Statistics Canada, Vital Statistics, Death Database and Demography Division (population estimates).

Women in the province continue to enjoy longer life expectancy than their male counterparts. However, the gap in life expectancy between the sexes continues to narrow. Between 1979 and 1999, life expectancy at birth increased 2.9 years for males to 75.4 years, and 1.8 years for females to 81.8 years. A female born in 1979 could expect to live 7.5 years longer than her male counterpart, while a female born in 1999 will live approximately 6 years longer than males born at the same time. Life expectancy at age 65 for both males and females also increased between 1979 and 1999; however, the gap between the sexes remained unchanged during this time period.

Saskatchewan residents have similar life expectancy to that of most Canadians. However, there is significant regional variation within Saskatchewan, which speaks to the importance of the determinants of health in influencing longevity.

Infant Mortality

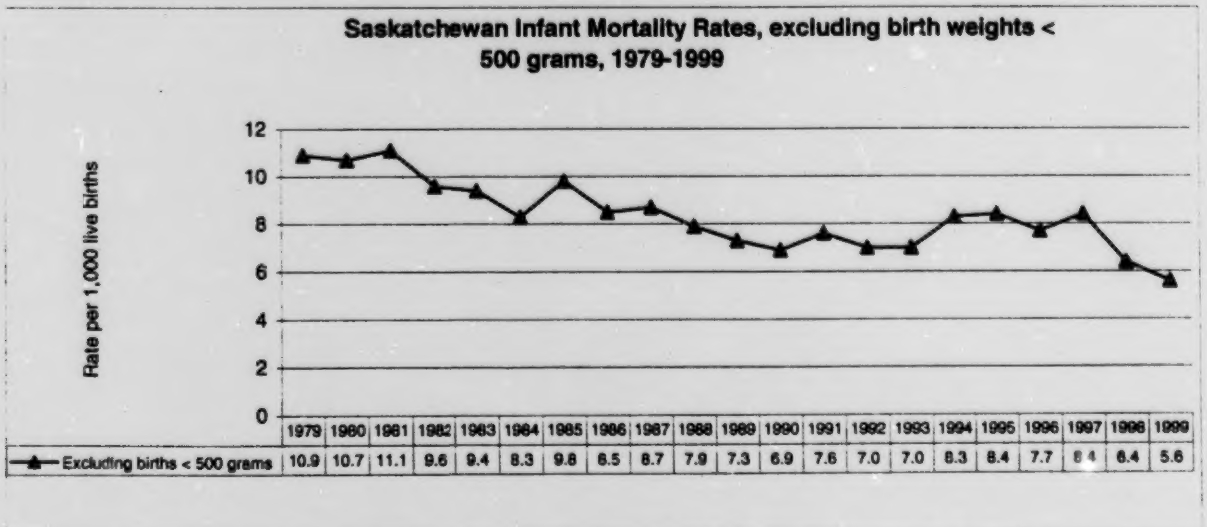
Of all other measures of health status, the infant mortality rate continues to be recognized as one of the most important measures of the health of a nation, its children and pregnant women. However, factors outside of the health system influence infant mortality. As a result this indicator does not necessarily reflect the performance of the health system.
It reflects not only the level of mortality, but also the health status and health care of a population. A high infant mortality rate is largely a reflection of deficiencies of physical and socio-economic factors such as nutrition, socio-economic status, education or health care.

The infant mortality rate is also related to maternal factors such as education level, age, and lifestyle habits such as smoking, drug or alcohol abuse.

As a comparable measure, the infant mortality rate is primarily limited by the fact that its definition has changed over time and across provinces, territories and internationally. Advances in medical technology may also bring about further changes in the definition. Infant death rates are also affected by demographic, regional and socio-economic differences unrelated to the health system. These factors can vary significantly not only between provinces, but also between different areas of the same province.
However, infant mortality rates can be a useful tool to measure the effectiveness of prenatal and postnatal programs, as well as monitoring the achievement of population health objectives.

In general, the infant mortality rate in Saskatchewan has been declining. The largest reductions in rates were recorded prior to 1992. For example, in 1979 there was a rate of 10.9 deaths per 1,000 live births (excluding birth weights lower than 500grams). In 1999 this had dropped to a rate of 5.6 deaths per 1,000 live births. A recent examination of Saskatchewan infant mortality rates from 1992 to 1997 suggests that more infant deaths occur among male infants (57%) than females, and to mothers who were under 30 years of age at the time of birth (76%). In addition, over half (56%) of infant deaths that occurred to mothers under the age of 20 were reported in the Registered Indian population.

Canada's infant mortality rate has declined dramatically in the last 35 years, as has the rate in Saskatchewan. In 1999 Saskatchewan ranked 9th out of all provinces and territories in terms of its infant mortality rate for infants of all weights.



Source: Statistics Canada Catalogue 84F0210XPB, Births and Deaths and Statistics Canada website.

A Story about Personal Health Practices

There is growing recognition that personal life "choices" are greatly influenced by the socio-economic environment in which people live, learn, and work. Nevertheless, measuring and reporting on indicators associated with healthy lifestyles helps us to understand the overall health of a population and the impact of health promotion activities.

Personal health practices and their outcomes include a wide range of measures. For the purposes of the report the following indicators are analyzed, the first four of which are based on self-reported survey data:

- Physical Activity
- Youth Smoking
- Exposure to Environmental Tobacco Smoke
- Body Weight
- Chlamydia
- HIV
- Potential Years of Life Lost (PYLL) due to Unintentional Injuries
- Potential Years of Life Lost (PYLL) due to Suicide

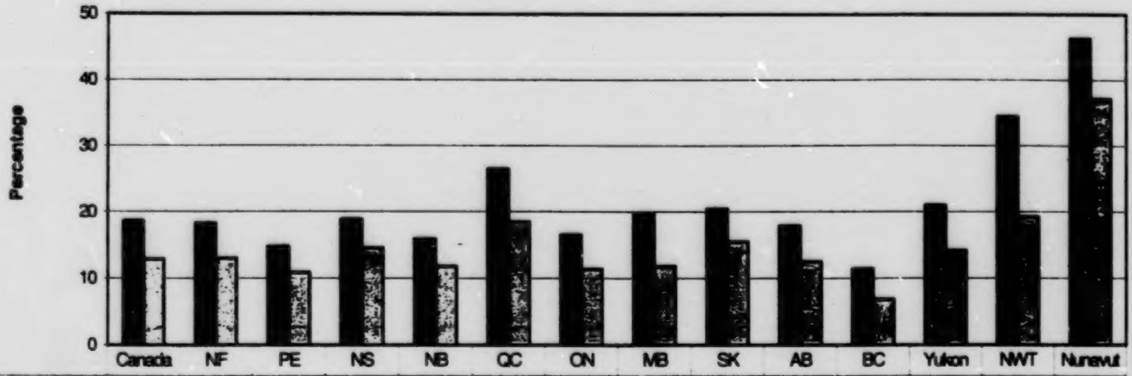
On most of these indicators Saskatchewan ranks in the middle of the pack among provinces and territories. However, we do not fare as well on smoking indicators or PYLL. A closer review of all of these indicators can be found in the main body of the report. Two indicators, smoking and body weight, are examined below.

Smoking

Smoking contributes to a range of health problems, including chronic lung disease, heart disease, stroke, and cancer of the lungs. The harmful effects of smoking do not end with the smoker, as second-hand smoke (also referred to as environmental tobacco smoke) has harmful effects on non-smokers. As well, research shows that although smoking rates have dropped significantly since 1970 among Canadians aged 15 and over, high rates of smoking still exist among youth, particularly among young women. This highlights the importance of preventing youth from starting to smoke.

The percentage of current youth smokers in Saskatchewan (i.e. those who smoke on a daily or occasional basis) was 20.5 % in 2000-2001 (Canadian Community Health Survey). Despite some fluctuation in this rate, overall the percentage of current teen smokers in the province is comparable to the 1994/95 percentage (20.4%). Saskatchewan ranks 9th out of 13 provinces and territories (i.e., had the fourth highest percentage) in terms of the number of youths who are current smokers. The percentage of teen smokers in the province in 2000-01 is higher than that recorded at the national level (18.7%) in the same time period. The percentage of youth in Saskatchewan who reported they were daily smokers (15.5%) is also above the national average of 12.9%.

Percentage of youth current and daily smokers aged 12-19, Canada, provinces and territories, 2000- 01



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
Current smokers	18.7	18.3	14.8	18.9	15.9	26.5	16.6	19.7	20.5	17.9	11.4	21	34.5	46.3
Daily smokers	12.9	13	10.9	14.6	11.8	18.5	11.4	11.8	15.5	12.5	6.9	14.2	19.3	37.2

Source: Canadian Community Health Survey

Several national and provincial programs have been put in place to try to assess and address youth smoking. For example in 2002 Saskatchewan proclaimed *The Tobacco Control Act*, to control the availability of tobacco in the province. Current studies, for example, have focused on youth smoking looking at specific groups such as adolescent females, aboriginal populations, youth from low socio-economic backgrounds, and children with special needs.

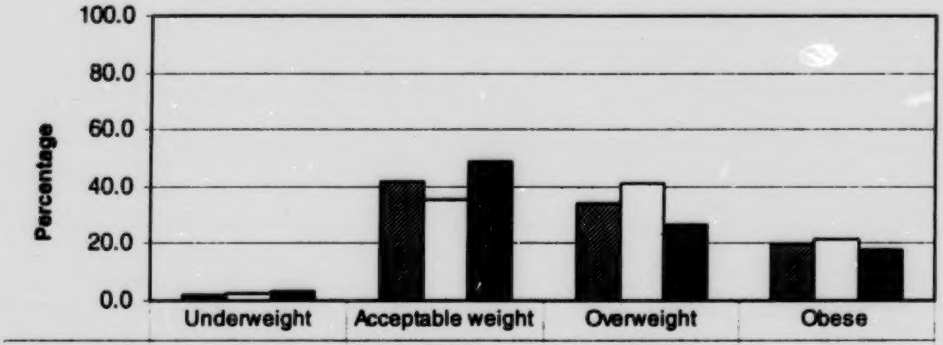
Body Weight

While body weight is not strictly a personal health practice, it is, to a large extent, determined by eating and physical activity practices. As such it remains an important composite measure of health status. Body weights above a healthy weight range, defined using the body mass index (BMI), are linked to several behaviourally modifiable diseases, including cardiovascular disease, diabetes and some forms of cancer. Furthermore, overweight and obese individuals are much more likely to suffer from a wide array of other health problems - asthma, arthritis, back problems, high blood pressure, thyroid problems, activity limitations and repetitive strain injuries.

The prevention of obesity and associated health consequences involves the promotion of healthy behaviours, especially a balanced diet and physical activity. Equally important is establishing an environment conducive to healthy behaviours and to behaviour change. It is one thing to promote physical fitness; it is another to make fitness facilities available and affordable. Similarly the promotion of a healthy diet is important, however, the availability, cost and culture around food and its preparation are also critical.

The proportion of overweight and obese adults in Saskatchewan increased from 1994 to 1999, before decreasing again in 2001 to around 53.7%. In other words, over half of the population of Saskatchewan aged 20 to 64 years, (excluding pregnant women) could be considered as high risk for contracting a health problem related to their weight. Although this rate is somewhat lower than that recorded in 1998/99 (60.4 %), it is still above the national average for 2000-01 (47.5%). With respect to gender differences, men in the province were more likely than women to be overweight (41.3 per cent versus 26.3 per cent) or obese (21.5 per cent versus 17.9 per cent).

Saskatchewan body mass index by sex, household population aged 20 to 64 excluding pregnant women, 2000- 01



	Underweight	Acceptable weight	Overweight	Obese
▨ Both sexes	2.0	41.9	34.0	19.7
□ Men	2.5	35.4	41.3	21.5
■ Women	3.2	48.6	26.3	17.9

Source: Canadian Community Health Survey – Cycle 1.1, 2000;
National Population Health Survey, 1994, 1996, 1998; ISQ

Note: Data for men aged 20 to 64 who are underweight should be interpreted with caution.

The proportion of overweight and obese individuals is high in all provinces and territories. Levels of overweight/obesity in Saskatchewan were 7th lowest among the 13 provinces and territories in 2000-01. Even so, about 63% of Saskatchewan men aged 20 to 64 and 44.2% of women in the province are overweight and obese and are at increased chance of serious health consequences.

The province recognizes the serious nature of obesity in Saskatchewan and has adopted several strategies aimed at promoting healthy behaviours, with a focus on diet. For example, Saskatchewan uses a model of primary care delivery, which is a collaboration between physicians, primary care nurses (nurses working in an expanded role), nurses, and other health professionals. The primary care model encourages proactive outreach and health promotion/prevention activities and may include broad range of human services. Saskatchewan has also adopted a provincial plan for the control of specific diet-related diseases such as diabetes. Diabetes prevention, care and treatment initiatives are being developed to meet the needs of both First Nations and non-First Nations people, with emphasis on making services culturally sensitive and locally accessible.

A Story about Public Health

Although the major threat of mortality associated with communicable diseases in Canada has changed in recent years, transmissible diseases continue to affect thousands of Canadians each year. Health protection and disease prevention programs are designed to anticipate, avoid and address these and other immediate and imminent threats to health.

Public health surveillance and protection potentially include a wide range of measures, however, for the purposes of the report the following indicators are analyzed:
- Measles
- Haemophilus influenzae b (Hib)
- Invasive Meningococcal
- Tuberculosis
- Influenza Immunization for 65+
- E.Coli

Saskatchewan's results for these indicators are mixed. On Hib and invasive meningococcal rates we have the lowest rates among the provinces and territories able to report. However our incidence of TB may indicate a need for improvement. A closer review of all of these indicators can be found in the main body of the report. Two indicators, measles and Hib are summarized below.

Measles

Measles is a very contagious infection for humans. It is capable of spreading even in populations with virtually 100% vaccination rates. As such elimination remains the key goal of The Pan-American Health Organization; it is also a national goal and objective that has been adopted by all provinces and territories (National Advisory Committee on Immunization, 1996). Two doses of measles vaccine is recommended for protection; the first dose is given at 12 months and the second dose prior to school entry, at either 18 months or 4-6 years of age. In the absence of global eradication, maintaining measles elimination requires ongoing, enhanced surveillance and continued high immunization coverage rates.

Measles occurs in periodic outbreaks, which makes data subject to significant fluctuation and misinterpretation. Nevertheless, reporting rates of new cases of measles provides some indication of the success of measles immunization programs in helping to eliminate measles provincially, nationally, and globally.

Other than periodic outbreaks, the rate of measles has been steadily declining since 1980. In Saskatchewan, measles incidence has generally been lower than that observed nationally in the past twenty years. In fact, in the past ten years, Saskatchewan has not had an outbreak of measles like those that have occurred in other parts of the country. Indeed, no new cases of measles have been reported in Saskatchewan since 1999, and only 33 cases were reported in Saskatchewan between 1995 and 1999.

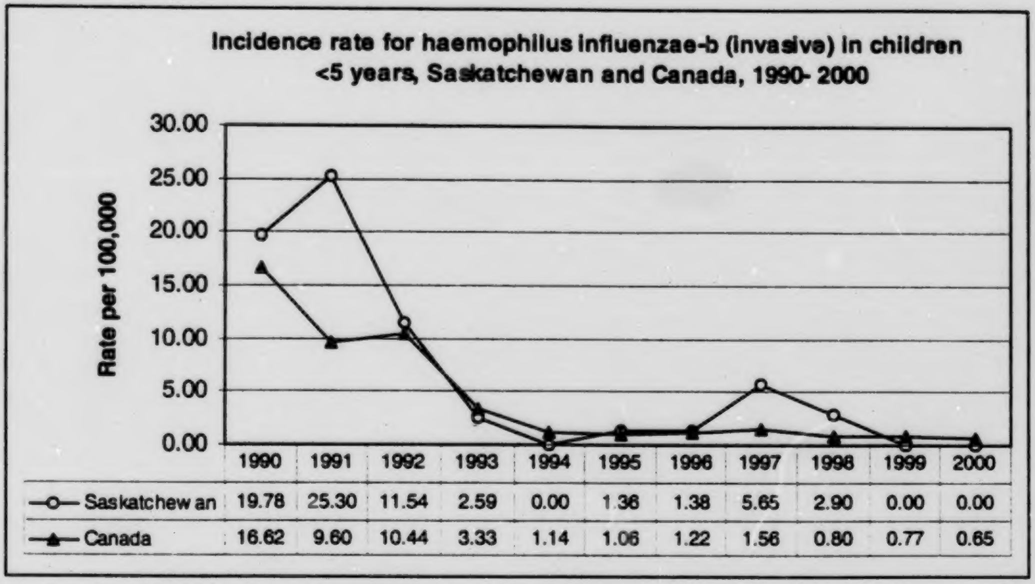
The introduction of nationwide immunization schedules has contributed to the consistently lower rates of measles observed in recent years. Saskatchewan started its secondary immunization scheme in the fall of 1996. In addition to the initial dose, a second dose is administered to all children, prior to their entry to school. Supplementary catch-up programs were also introduced in the province in the same year aimed at grade 6 and 8 students.

Despite this apparent relative success in decreasing the risk of contracting measles at the provincial and national level, surveillance remains extremely important. In the absence of global eradication, maintaining measles elimination requires ongoing, enhanced surveillance and continued high immunization coverage rates.

Haemophilus influenzae b (Hib)

Prior to the introduction of Hib vaccines, Hib was the most common cause of bacterial meningitis and a leading cause of other serious invasive infections in children. Vaccine preventable cases are now rare. Four doses of the vaccine are given in combination with diphtheria, pertussis, tetanus, and polio before the age of 2 years. The continued surveillance of Hib infection rates remains an important indicator of the success of immunization programs designed to eradicate invasive Hib from the population, especially in children less than 5 years.

Incidence rates for Hib in Saskatchewan children younger than five years fluctuated between 1990 and 2000. Overall, provincial trends were similar to those observed at the national level, as seen in the figure below.


Incidence rate for haemophilus influenzae-b (invasive) in children <5 years, Saskatchewan and Canada, 1990- 2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
—○— Saskatchewan	19.78	25.30	11.54	2.59	0.00	1.36	1.38	5.65	2.90	0.00	0.00
—▲— Canada	16.62	9.60	10.44	3.33	1.14	1.06	1.22	1.56	0.80	0.77	0.65

Source: Notifiable Disease Reporting and Enhanced Surveillance System & Centre for Communicable Disease, Saskatchewan Health.

Note: Rates for Saskatchewan are calculated from the incidence of Hib in children under 5 that is entered in the province's Centre for Communicable Diseases database, and not from the data provided by Statistics Canada. Provincial level data is cleaner (greater assurance is provided that the estimates given represent just type B cases and not all haemophilus influenzae), and more complete (covers the data period after which data are sent to Statistics Canada) than the estimates sent to Statistic Canada, and that appear in the provincial comparison data provided online. Data for 2000 are provisional.

Decreases in the incidence of Hib infection occurred during the period in which the conjugate virus program was introduced (1988-1992), with the biggest decline occurring between 1992 and 1993, following the introduction of infant-based Hib vaccination programs province wide. Nationally, infection rates continue to decrease, although inter-provincial rates vary. This indicates that although widespread use of conjugate vaccines has reduced Hib among young children, circulation of the bacteria continues.

With the exception of Saskatchewan (0 cases per 100,000), Hib incidence rates for the Prairie Provinces are higher than the national average in 1999. However, there is no room for complacency. Monitoring the incidence of newly reported cases of invasive Hib disease remains an important indirect indicator of health status.

A Story About Select Diseases

Once a significant cause of morbidity and death in Saskatchewan, the chances of contracting a contagious disease have paled in significance in recent years in contrast to today's major causes of mortality and morbidity. Cardiovascular disease (including heart attack and stroke) and cancer have become the major challenges to health and health care in the developed world. Only prostate, breast, lung and colorectal cancer are examined in the report as they represent the four most common cancer sites. Chapter 4 focuses specifically on these select diseases in terms of their incidence, mortality rate, and premature mortality rate (potential years of life lost) in addition to relative survival rates for the selected cancers.

Saskatchewan's indicators show both positive results, and areas that require improvement. For example on five-year age-standardized relative survival for colorectal cancer we rank first among the provinces and territories able to report. However, we rank lower on potential years of life lost from stroke or age-standardized mortality for Acute Myocardial Infarction. A closer review of all of these indicators can be found in the main body of the report. Two indicator areas, prostate and breast cancer are examined in more detail below.

Breast Cancer – Incidence, Potential Years of Life Lost (PYLL), Mortality and Survival

Incidence

Breast cancer is the most frequently diagnosed cancer among Canadian women, and is also one of the leading health problems among women over the age of 50.

Between 1976 and 1997, Saskatchewan's age-standardized breast cancer incidence rate increased by 32 per cent from 76.4 cases per 100,000 females to 100.7 cases. A similar trend was experienced at the national level. Based on 1997 data, Saskatchewan had the fifth lowest age-standardized female breast cancer incidence rate (100.7 cases per 100,000), of 12 jurisdictions for which data was available.

It should be noted that increases in female breast cancer incidence rates may be related to early detection through breast self-examination, as well as increased mammography screening. Increases in breast cancer incidence due to improved screening and detection will eventually disappear as the rate stabilizes.

PYLL

PYLL refers to the number of years of life potentially lost as a result of premature death (i.e., death prior to age 75). PYLL complements incidence and mortality indicators by focusing on mortality among the non-elderly. It reflects the level of success in preventing premature (and therefore presumably postponable) loss of life, with its consequent loss of social and economic productivity.

Saskatchewan's rates of potential years of life lost (PYLL) due to breast cancer per 100,000 females were below the national rates in the 1979- 1999 period. In 1979, for every 100,000 females in Saskatchewan aged 0 to 74, there was a potential loss of 344.3 years of life as a result of premature death due to breast cancer. In 1999, the PYLL rate for breast cancer had declined to 299.7 years of life lost per 100,000 females. This rate was the fourth lowest of all provinces and territories in 1999. Despite some fluctuations, a similar trend also occurred at the national level. Therefore, although incidence rates have exhibited a rise over time, rates of premature mortality have decreased, highlighting the artifactual nature of incidence rates and the problems in interpretation when measures are used independently of each other.

Mortality

Breast cancer surveillance is further augmented by mortality rates for the disease. Saskatchewan's age-standardized deaths due to breast cancer, showed a general decline from 29 deaths per 100,000 females in 1979 to 21.7 deaths per 100,000 females in 1999 - the third lowest rate in the country in 1999. The national age-standardized breast cancer mortality rate also declined in the 1979-1999 period. However, like the data from Saskatchewan, the national mortality rates in this time frame were marked by fluctuations.

Survival

Saskatchewan had the third highest age-standardized relative survival rate (83%) for female breast cancer in Canada in 1997. In other words, for women aged between 15 and 99 years residing in the province who were diagnosed with breast cancer in 1992, 83 % were still alive 5 years later. Provincial variations in relative survival rates for breast cancer may be explained by the use of mammography for early diagnosis. Longer survival times could mean either that cancer is being diagnosed at an earlier stage, because of effective screening programs or patients with cancer are living longer, possibly due to better treatment. Cancer screening procedures can inflate relative survival rate estimates, by extending the time between diagnosis and death from cancer. However, Canada still has one of the highest relative survival rates for breast cancer.

The usefulness of these indicators can only be truly appreciated when they are examined in conjunction with each other. Although incidence rates for breast cancer have increased in Saskatchewan, and at the national level in recent years, declining rates of mortality and premature mortality and increases in relative survival rates highlight significant improvements in early detection and screening procedures.

Prostate Cancer – Incidence, Potential Years of Life Lost (PYLL), Mortality, Survival

Incidence

Prostate cancer is an excellent example of how the use of several indicators can provide a picture of the effects of a specific disease. Prostate cancer is the most commonly diagnosed cancer among Canadian men, excluding non-melanoma skin cancer, and appears to be on the increase. Furthermore, like other forms of cancer, prostate cancer is related to age, and increases almost exponentially with years of life lived.

Taken alone, incidence rates suggest that there has been a rapid increase in the rate of prostate cancer in all provinces, in recent years. The incidence of prostate cancer on a national and provincial basis has increased from 1976 to 1997. In Saskatchewan 75.1 cases per 100, 000 were reported in 1976 and 111.7 cases by 1997. However, the widespread rise in the use of improved detection techniques (Canadian Cancer Statistics, 2001) is responsible for much of the dramatic increases in prostate cancer incidence. Although there has been some levelling out of incidence rates in recent years (i.e., post 1993) the use of more sensitive screening procedures may account for the relatively high number of newly diagnosed prostate cancer cases reported in Saskatchewan, and the country as a whole. As well, international differences may be partly explained by variations in screening procedures that occur from country to country.

Saskatchewan had the 6th lowest incidence of prostate cancer of all provinces and territories in 1997. Inter-provincial differences could possibly be due to regional variations in screening techniques and the establishment of early detection programs, as well as regional variation in the prevalence of risk factors. Further study is required to determine the role of lifestyle and possible risk factors in development of prostate cancer.

PYLL

Saskatchewan trends in premature mortality have not mirrored the national picture. From 1979 to 1999, the Canadian national average has remained fairly stable, rising from 54.4 years per 100,000 to only 55.6 years. In Saskatchewan, however, larger fluctuations in the PYLL rates for prostate cancer have been observed. These rates have remained consistently higher than the national average. The PYLL rate in 1999 (80.2 years per 100, 000) is only slightly lower than that in 1979 (84.6 years per 100, 000).

Furthermore, Saskatchewan men appear to have a higher rate of premature mortality from prostate cancer than men in any other province or territory in Canada. Although provincial differences exist in the rates of premature mortality recorded from prostate cancer in men, debate remains as to the exact contribution that early screening and treatment has in reducing the potential years of life lost due to this disease.

Mortality

National and provincial trends are more consistent in the area of age-standardized death rates from prostate cancer. Within Saskatchewan, the mortality rate due to prostate cancer increased between 1979 and 1999 from a low of 26.1 deaths per 100, 000 in 1979 to a high of 38.3 deaths per 100, 000 in 1999. Furthermore, the death rate from prostate cancer in Saskatchewan remained relatively similar to the national average until the latter part of the time trend. Since 1996 the national mortality rate from prostate cancer has continued to fall, whereas for men living in Saskatchewan, it has continued to rise.

As was found with the premature mortality rate from prostate cancer (PYLL), the death rate for Saskatchewan men was higher than that observed for any other province or territory in 1999. However, debate continues over the effectiveness of screening measures as a means to reduce overall mortality from prostate cancer. Indeed, the mortality rates do not follow the same regional variation pattern as the incidence rates for prostate cancer. Saskatchewan's incidence rate is lower than several other provinces despite its relatively high mortality rate. The fact that there is a narrower range in overall mortality rates from prostate cancer than for incidence rates further suggests that earlier detection of prostate cancer has less impact on mortality than the early screening procedures in other types of cancer.

Survival

Because prostate cancer usually occurs in older men who often have other health problems, relative survival rates are generally used to produce a standard way of discussing prognosis (outlook for survival). Caution must be used, however, in interpreting relative survival rates due to the possibility of lead-time bias introduced by the advent of PSA testing in the early 1990s.

Saskatchewan's 5 year relative survival rate was 83% in 1997, slightly below the national average of 87%. In other words, 83% of men diagnosed with prostate cancer in 1992 were still alive 5 years after their first diagnosis. At the national level, provinces experience similar relative survival rates. Saskatchewan's rate is the 4th highest out of all 8 provinces for which data is available. Therefore, although mortality rates indicate that more men die in Saskatchewan from prostate cancer than any other province, the time to death in those diagnosed with the disease is not dissimilar to that experienced in other provinces across Canada.

A Story about Health Services

The final chapter of the report examines selected health service indicators. In the body of the report 13 indicators are analyzed. The analysis is organized around 4 categories:

- age-related services (hip and knee replacement rates and home care admissions);
- access to services (wait times and access to 24/7 first contact services);
- readmissions and hospitalizations (pneumonia and AMI readmissions and hospitalizations for ambulatory care sensitive conditions); and
- satisfaction (overall, hospital services, physician services and community based services).

Saskatchewan's indicators show areas of strength, and areas of weakness. On some measures of satisfaction we rank first among the provinces and territories. However on some measures, such as those for knee replacement, Saskatchewan does not rank as high (although for some of these measures there is no benchmark and therefore it is difficult to say whether more is always better). A closer review of all of these indicators can be found in the main body of the report. Two indicators, wait times for coronary arterial bypass graft and patient satisfaction are examined below.

Waits for Coronary Artery Bypass Graft (CABG) Surgery

Until relatively recently, waiting lists in Canada have been non-standardized, poorly organized, and inadequately monitored. As a result, the systematic collection and reporting of wait time data is relatively new, and jurisdictional differences are likely to exist in the definition of specific indicators of waiting times. For example, wait times can be calculated from when a person first visits a family doctor, when the patient is assessed by a specialist, when test results confirm the need for further treatment, or from some other point. This ultimately hinders comparisons within and between provinces/territories as even when the same measurement criteria are selected, the required data is often not available.

The measurement and reporting of wait times for CAGB surgery, like other types of surgery, have not been standardized in Canada, and inter-provincial comparisons of wait time data have not been available. We recognize that reporting on a nationally agreed upon indicator would be a significant step towards gathering accurate and comparable information on wait times for surgery. To this end, Saskatchewan has calculated this indicator for the first time and although limitations exist, work now underway to improve wait list data will strengthen our capability to report on wait time indicators in the future. Comparisons with other wait list reports and other provincial jurisdictions are not recommended unless the same measurement criteria have been used.

Specific limitations also apply. "Months to clear wait list" was not calculated as limitations of the currently available wait list data would make it impossible to meet the specifications, and to obtain results that would be reasonably comparable to other jurisdictions. However, "Median wait for surgery" and "Distribution of wait times" were calculated, using the CIHI Discharge Abstract Database (DAD) to identify the CABG cases performed, and to calculate a wait time based on the most recent previous cardiac catheterization.

Wait times for CABG in Saskatchewan are presented on a quarterly basis. Of the 504 procedures that were carried out in the province in 2000-01, 25.6% occurred in the first quarter, 24.8% in the second quarter, 26.0 % in the third quarter, and 23.6% in the fourth quarter. The median wait time, however, remained the same for the first three quarters of the year (1.43 weeks), rising slightly to 1.57 weeks in the last quarter.

The largest percentage of cases waiting for CABG surgery (between 55% and 59%) were dealt with in 14 days or less, as calculated from the date of the last recorded cardiac catheterization, on or before the surgery date. Very few people (less than 4%) waited 180 days or more to receive their CABG surgery in Saskatchewan. These numbers include both emergency and non-emergency cases.

The size and growth of surgical waiting lists, and the length of time some people are waiting for some non-emergent surgery, is a concern in Saskatchewan, as it is across the country. In August 2001, the Minister of Health appointed an external team to review waitlist initiatives and recommend a strategy to improve access to needed surgical procedures in the Province. The team's report, which recommended the continuation of some existing initiatives and the adoption of some new initiatives, guided the wait list strategy that is outlined in Saskatchewan's Action Plan for Saskatchewan Health Care.

Ultimately the goal of the new action plan is to ensure that patients who are waiting for surgery in Saskatchewan receive the care they need within clinically appropriate timeframes and in a fair and equitable manner.

This goal will be achieved through a comprehensive wait list strategy. The first step in implementing the new strategy was the appointment of the Saskatchewan Surgical Care Network (SSCN), an advisory body, to oversee improvements to the surgical system. The SSCN will oversee the key elements of the new strategy now underway, such as to:

- improve wait list data and management of wait lists through the creation of a Saskatchewan Surgical Registry that will track all patients needing surgery in the province;
- improve fairness among patients by developing and implementing standard criteria for assessment of need;
- provide better information to the public through a variety of initiatives, such as the designation by the regional health authorities of key contact people to respond to questions from the public and the development of a patient-centred web site.

There are also elements aimed at improving operational efficiency and enhancing capacity through initiatives such as the provision of surgical wait list funding and the development of human resource strategies.

Patient satisfaction

The report concludes with an examination of subjective assessments of health service operation. The information for this indicator was obtained from a national household survey of the population 15 years of age and older. The results are based on the number of individuals who reported excellent or very good quality of care and who rated themselves as either very satisfied or somewhat satisfied with the quality of care for (a) overall health services, (b) services received in hospital, (c) services received from a family doctor or other physician, and (d) community-based services. The percentages are calculated based on the number of people who received health care services rather than the entire population. In Saskatchewan 80.7% of residents report receiving *some type of health care service* in the previous twelve months, slightly above the national average of 75.6%. This higher rate of care may be due in part to the fact that Saskatchewan's population is older than the national average.

A vast majority of those who received service in Saskatchewan were satisfied with the service and rated the service high quality:

- 85.6% of Saskatchewan residents who received health care services in the previous twelve months rated the quality of health care they obtained as excellent or very good;
- 85.3% of Saskatchewan residents were very or somewhat satisfied with the health care services they received;
- 81.2% of Saskatchewan residents who received hospital services rated the quality of hospital care as excellent or very good;
- 82.9% of Saskatchewan residents were very or somewhat satisfied with the hospital care received;

- 91.2% of Saskatchewan residents rated the quality of family doctor or other physician care as excellent or very good;
- 92.6% of Saskatchewan residents were very or somewhat satisfied with the family doctor or other physician care received;
- 84.8% of Saskatchewan residents rated the quality of community-based health care service as excellent or very good;
- 90.3% of Saskatchewan residents were very or somewhat satisfied with the community-based health care services received.

In general, residents of Saskatchewan appear to be as satisfied with overall health care services, services received in a hospital, services received from a family doctor or other physician, and community based services as residents of other provinces. In addition, Saskatchewan residents appear to rate the quality of these services as highly as do residents of any other province.

Saskatchewan Health is making efforts to improve the quality and effectiveness of health service. Saskatchewan is the only province to have a provincially coordinated approach to tracking and reporting on client concerns.

While patient satisfaction is an important indicator for assessing the quality or effectiveness of health services, it has many limitations. The reasons for an individual's perception of satisfaction or dissatisfaction or quality of service are unknown and could be related to a number of complex and interrelated factors. Patient satisfaction, therefore, remains a subjective measure of health service operation and one that should be used in conjunction with more objective assessments of the quality of health care received at the provincial level. More detailed subjective assessments of satisfaction would also provide further information about which areas to focus on for improvement.

In Conclusion

By examining health status, personal health practices, public health, select diseases, and health services, this report contributes to our knowledge and understanding of health care in the province. Admittedly, many of the measures need further development, and the report is lengthy and complex, due to the complexity of selected measures, the technical nature of the reporting requirements and the sheer volume of the report.
Nevertheless, data presented in this report enhances the province's ability to increase accountability in health care, and rely on comparable indicators in making sound, research-based decisions about the future of the health care system in Saskatchewan.

THIRD PARTY VERIFICATION

Management's Representation

Saskatchewan Health is responsible for the presentation of the information contained in the *Saskatchewan Comparable Health Indicators Report.* This responsibility includes the analysis, presentation and interpretation of the data within the parameters provided by the Performance Indicators Reporting Committee and approved by the Conference of Deputy Ministers of Health.

Saskatchewan Health shares the responsibility with outside agencies for much of the information produced in this Report. Saskatchewan Health provides Vital Statistics information to Statistics Canada and works with Statistics Canada to ensure these data and subsequent analyses are valid. Saskatchewan Health provides disease information to Health Canada. In most circumstances hospital information is provided directly by regional health authorities (RHAs) to the Canadian Institute for Health Information (CIHI). Saskatchewan Health, CIHI and RHAs work together to ensure the data and subsequent analyses are valid.

Criteria used to prepare the report

The health indicators in the Report are presented in accordance with the following criteria, unless otherwise stated in the Report.

1. The health indicators reported meet all performance measurement and reporting requirements of the commitment of the *First Ministers' Meeting Communiqué on Health*. The health indicators comply with the definitions, technical specifications and standards of presentation approved by the Conference of Deputy Ministers (see Appendix A).

2. The health indicators reported adequately reflect the facts, to an appropriate level of accuracy.

3. The health indicators are defined and their significance and limitations are explained. The Report states and properly describes departures from what was approved by the Conference of Deputy Ministers and explains plans for the future resolution of the non-compliance issues.

For each indicator, the report describes any departures from the criteria under the heading of Limitations.

Auditor's Report

First Ministers directed jurisdictions to engage third parties to verify their respective reports. The Provincial Auditor of Saskatchewan was selected as third party verifier for the *Saskatchewan Comparable Health Indicators Report.* The Auditor's Report is also included on page xxx.

Limitations in source data

Most of the health indicators were produced by outside agencies from data collected by Saskatchewan Health, regional health authorities, and Statistics Canada (through two national surveys). The outside agencies are Statistics Canada, Health Canada, and the Canadian Institute for Health Information (CIHI). A list of the indicators by source is attached to this representation.

Maintaining and enhancing the quality of incoming data is essential to the mandates of Statistics Canada, Health Canada, CIHI and Saskatchewan Health to produce high quality health information. These organizations maintain data quality processes to ensure the continued regular improvement of the quality of databases and registries to meet changing and expanding user requirements and expectations. This facilitates the production of relevant and credible data for analyses and reports. Health Canada, Statistics Canada and Saskatchewan Health have similar quality regimes. CIHI's quality processes are provided below as an example.

CIHI's data quality framework, which was implemented in Fiscal 2000/01, provides a common strategy for assessing data quality across CIHI databases and registries.
The Framework is built upon five dimensions of quality:

- accuracy,
- comparability,
- timeliness,
- usability and
- relevance.

CIHI's Discharge Abstract Database (DAD) and Hospital Morbidity Database are used for numerous indicators included in this report. Quality data in these two databases depends on quality coding functions in most hospitals across the country.

CIHI does edit checks to verify and correct codes. CIHI also invests heavily in training of health records professionals to improve the quality of data abstraction for purposes of these databases. In addition health records professionals themselves are highly trained and have checks for example to ensure that the number of abstracts submitted equals the number of discharges. All Saskatchewan acute care facilities submit data directly to CIHI.

CIHI is conducting a three year data quality study in which health records professionals go back to the original source of data and re-abstract patient charts and compares the original data submitted to the DAD. The study will give estimates of discrepancies and will highlight areas for improvement in coding guidelines and educational material for health records professionals. CIHI has released preliminary year 1 findings from this study. On the national level four CIHI health indicators had fewer than 5% discrepancies: coronary artery bypass graft, caesarean section, vaginal birth after caesarean and total hip replacement. Some indicators had more than 5% discrepancies, for example, ambulatory care sensitive conditions (10.9%), hospitalization due to pneumonia (7.1%) and injury hospitalization.

In some of these cases the proportion of discrepancies are significant and we should expect similar proportions of discrepancies in the CIHI produced data used to calculate the indicators presented in this report. This should be noted when using and interpreting the information presented in this report.

It should be noted that all survey data is adjusted for non-response.

Legislative Auditors' opinions

Legislative auditors have recently audited the control systems established by Statistics Canada, Health Canada, CIHI, and Saskatchewan Health to ensure reliable data.

The Auditor General of Canada has determined that Statistics Canada's controls are adequate to ensure reliable data including the data received from Saskatchewan Health and regional health authorities. Statistics Canada produced most of the indicators in the Report.

The Auditor General of Canada is of the opinion that Health Canada's controls are not adequate. This may compromise data reliability including the reliability of data received from Saskatchewan Health.

The Auditor General of British Columbia is of the opinion that CIHI's controls are not adequate. This may compromise data reliability including the reliability of data received from Saskatchewan regional health authorities.

The Provincial Auditor of Saskatchewan is of the opinion that Saskatchewan Health's controls are not adequate. This may compromise reliability of the data provided to CIHI and Health Canada, and for data Saskatchewan Health used to produce health indicators set out in the Report.

These audit opinions suggest that there may be some uncertainty about the reliability of the indicators produced by CIHI, Health Canada, and Saskatchewan Health. Accordingly, readers should use caution in interpreting these indicators. However, Saskatchewan Health believes that the information on comparable health indicators set out in this Report is useful information for legislators and the public. As noted above, Saskatchewan Health intends to work with regional health authorities and outside agencies to improve the reliability of the health indicators.

List of Indicators by Source

Statistics Canada

1. Life expectancy
2. Disability-free life expectancy
3. Infant mortality
4. Low birth weight
5. Self-reported health (percentage of the population age 12+ who report their health is very good or excellent)

6-11. Age standardized mortality for lung, prostate, breast & colorectal cancers, acute myocardial infarction & stroke

12-15. Five year age standardized relative survival rates for lung, prostate, breast & colorectal cancers

16. 365-day relative survival rate for acute myocardial infarction*
17. 180-day relative survival rate for stroke*

18-21. Incidence rates for lung, prostate, breast & colorectal cancers

22-29. Potential years of life lost due to lung, prostate, breast & colorectal cancers, and acute myocardial infarction, stroke, injury, suicide

30-33. Patient satisfaction (overall health care services, hospital care, doctor or other physician care, community based health care)

34-37. Access to 24/7 first contact health services (difficulty obtaining routine or on-going health services, difficulty obtaining health information or advice, difficulty obtaining immediate health care, percent heaving a regular family doctor)

38. Self-reported exposure to environmental tobacco smoke
39. Percentage current teenage smokers
40. Physical activity
41. Body weight
42. Immunization for influenza for 65+

Health Canada

43. Invasive meningococcal disease incidence rate
44. Measles incidence rate
45. Haemophilus influenza b (invasive) disease incidence rate
46. Prevalence of diabetes*
47. Tuberculosis incidence rate
48. Reported HIV diagnoses
49. Verotoxogenic E. Coli incidence rate
50. Chlamydia incidence rate

CIHI

51. 30-day acute myocardial infarction in-hospital mortality rate
52. 30-day stroke in-hospital mortality rate
53. Total hip replacement rate
54. Total knee replacement rate
55. Risk adjusted acute myocardial infarction re-admission rate

56. Risk adjusted pneumonia re-admission rate
57. Rate of hospitalization for Ambulatory care sensitive conditions

Saskatchewan Health

58. Wait times for cardiac surgery
59. Wait times for hip replacement surgery
60. Wait times for knee replacement surgery
61. Wait times for radiation therapy for breast cancer*
62. Wait times for radiation therapy for prostate cancer*
63. Reported wait times for specialist physician services
64. Reported wait times for diagnostic services
65. Reported wait times for surgery
66. Admissions to publicly funded home care per capita
67. Estimated percentage of population receiving homemaking, nursing or respite services*

* - Indicator not reported by Saskatchewan

Auditor's Report

To the Legislative Assembly of Saskatchewan

I have audited the health indicators presented in pages 1 to 337 of the *Saskatchewan Comparable Health Indicators Report* (the Report) pursuant to the commitment under the *First Ministers' Meeting Communiqué on Health*, dated September 11, 2000. The Conference of Deputy Ministers of Health defined the specific indicators to be regularly reported to Canadians. Reporting on health indicators in accordance with suitable criteria is the responsibility of management. My responsibility is to express an opinion on the health indicators based on my audit. I have not assessed the relevance of the indicators used. My audit work was limited to the information relating to the most recent year. I have not audited the health indicators of other jurisdictions presented in the Report. As well, the Report includes a discussion and analysis for each health indicator in addition to a description of the indicator's definition, technical specifications, results and limitations. My examination of the discussion and analysis was limited to ensuring that the information is not inconsistent with the indicator results.

Except as explained in the following paragraph, I conducted my audit in accordance with the standards for assurance engagements established by The Canadian Institute of Chartered Accountants. Those standards require that I plan and perform an audit to obtain reasonable assurance that the health indicators presented in accordance with the criteria set out on page xxv of the Report are free of significant misstatement. An audit includes examining, on a test basis, evidence supporting the results of the health indicators and the related disclosures in the Report. An audit also includes assessing the suitability of the stated criteria and their disclosure. As well, an audit includes assessing significant judgments made by management, and evaluating the overall presentation of the health indicators.

As described on pages xxvi-xxvii of the Report, the controls established by Saskatchewan Health, Health Canada, and the Canadian Institute for Health Information were not adequate to ensure that the health indicator results those agencies produced for the Report are complete, accurate and adequately disclosed in the Report. These health indicators are listed on pages xxviii-xxix of the Report. I was unable to determine by other auditing procedures whether adjustments might be necessary to make these reported indicators complete, accurate, and adequately disclosed.

In my opinion, except for the indicators described in the preceding paragraph for which I am unable to form an opinion, the health indicators, including the described departures from the stated criteria, present fairly in all significant respects the information required pursuant to the public reporting commitment of the *First Ministers' Meeting Communiqué on Health* in accordance with the stated criteria set out on page xxv of the Report.

Comparative health indicators relating to some provinces and territories and for Canadian government programs have been audited by other auditors while, for other provinces,

auditors have been engaged to perform specified auditing procedures. Annex 1 includes an explanation of the differences between these two types of engagements and details regarding the nature of the engagements performed in each of the jurisdictions. The auditors' findings and observations resulting from engagements in other Canadian jurisdictions are included in the respective governments' health indicators reports and are not reproduced in the Report. All international health indicators are un-audited.

I am encouraged by the work undertaken by Saskatchewan Health to prepare a public report on health indicators. The Report is a continuing work in progress. Management has set out, as departures from the criteria, areas where the health indicators depart from the criteria in the Management's Representation, Appendix A, and Appendix D of the Report and throughout the Report under the heading of Limitations. Management has fairly stated the departures and why they exist. Readers are encouraged to use the Report, but in doing so, to keep in mind management's explanations of the departures.

Regina, Saskatchewan
September 16, 2002

Fred Wendel, CMA, CA
Provincial Auditor

ANNEX 1 - Verification of Comparative Information from Other Jurisdictions

The governments of Canada and the Provinces have adopted different approaches to meet the September 2000 *First Ministers Meeting Communiqué on Health* requirement for "third party verification" for their health indicators reports. Some governments have engaged their auditor to provide audit assurance on their health indicators reports and others have asked for specified auditing procedures to be applied. The paragraphs below outline the major differences between an audit assurance engagement and a specified auditing procedures engagement. For a complete comparison, please refer to The Canadian Institute of Chartered Accountant (CICA) Handbook section 5025 for audit assurance engagements and Handbook section 9100 for specified auditing procedures engagements. I think, for the reasons described in the following paragraphs, that an audit under CICA Handbook section 5025 is the best approach.

In an attest audit engagement, the auditor's responsibility is to provide assurance to users, in the form of an audit opinion, on a report prepared by management. The auditor determines the nature, extent, timing, appropriateness, and sufficiency of audit procedures, which, in the auditor's judgment, are necessary to provide audit assurance concerning the subject matter, or the *Comparative Health Indicators Report* in the present context.

In a specified auditing procedures engagement, the auditor's responsibility is to report the results of applying auditing procedures specified by management on a report prepared by management. As the nature and extent of specified auditing procedures may vary from engagement to engagement, such engagements are difficult to compare. And because the extent of the procedures performed is not sufficient to constitute an audit, the specified procedures reports do not provide audit assurance. The specified procedures report states those procedures actually applied and only the factual results of those procedures, leaving the reader to determine the fairness of the information in the health indicator reports.

The following is a list of jurisdictions that have engaged their auditor to provide audit assurance on their health indicators reports and those that have asked for specified auditing procedures to be applied.

Audit opinion	Specified Auditing Procedures
British Columbia	Alberta
Saskatchewan	Ontario
Manitoba	New Brunswick
Quebec	Prince Edward Island
Nova Scotia	Newfoundland and Labrador
Yukon	
Northwest Territories	
Nunavut	
Canada	

INTRODUCTION

Introduction to the Saskatchewan Health Indicators Report

The Saskatchewan Comparable Health Indicators Report contains sixty-one (61) measures that together tell a story about the health of Saskatchewan residents and selected health services in the province. The report provides a wealth of information which will assist individuals to assess how we are doing in the areas of health status, personal health practices, public health activities, selected diseases and conditions and in the provision of selected health services.

The report is an important first step in public reporting for purposes of accountability and begins to move us away from measuring performance based primarily on input and output measures (e.g. number of physicians and nurses, dollars spent, surgeries performed). This first Comparable Health Indicators Report still contains some input and output measures, as this is the form most of our information collection takes. The current report must therefore be considered a work in progress. Future iterations of the report will build on the current work and move toward an improved performance measurement framework as well as improved measures.

The Saskatchewan Comparable Health Indicators Report is the result of a commitment by First Ministers in September 2000. At that time First Ministers agreed that all provinces and territories would provide comprehensive and regular public reporting. The commitment was made in the context of significant infusion of new federal funds through the Canada Health and Social Transfer. There are several benefits that can be realized through FPT comparable reporting. These include:

- improved accountability to the public;
- improved public understanding of health system performance;
- improved decision making;
- promotion of best practices; and
- enhanced performance of the health system.

There are currently 67 common measures for comparable reporting agreed to by all jurisdictions. Data for all 67 is not available for all provinces and territories, however, all have agreed to report on the measures for which data is available. The Saskatchewan Comparable Health Indicators Report contains 61 of the 67 measures (all measures for which reliable information is available).

Given the number of mandatory measures and the common reporting requirements this report is very long and technical. In addition it tells a complex and at times contradictory story. For example, when compared to other jurisdictions and the national average, Saskatchewan rates favourably on some measures and less favourably on others. Specifically Saskatchewan fairs less favourably on the following health indicators:

- Self reported health;
- Infant mortality;
- Current youth smokers;
- Exposure to second hand smoke;
- Rates of chlamydia;
- Potential Years of Life Lost (PYLL) for unintentional injury;
- Mortality rates for acute myocardial infarction (AMI);
- PYLL for stroke;
- Knee replacement rates.

Nevertheless, Saskatchewan rates more favourably on the following health indicators:

- Life expectancy at 65, disability free life expectancy;
- Physically active;
- Incidence of Haemophilus influenzae b (Hib) and invasive meningococcal disease;
- Rates of E. coli;
- Stroke in hospital mortality;
- Rates of breast cancer;
- Survival rates for colorectal cancer;
- Access to 24/7 first contact;
- Readmission rates for AMI.

In other words, the Saskatchewan population and Saskatchewan health services and outcomes fair favourably on some measures and not so favourably on others. Some of the measures point to Saskatchewan strengths and weaknesses that are relatively common knowledge. Further, we have been addressing many of the apparent weaknesses through health promotion campaigns (smoking, diet, physical activity), program development (early childhood development, wait list initiatives) and legislation (smoking). Finally, we also know that current Saskatchewan programs sustain many of our strengths (vaccination programs, breast cancer screening) revealed in this report.

Some of the measures assessed in the report are difficult to interpret. For example rates of hip and knee replacements are difficult to assess. We do not know whether more hip replacements are always better. At the individual level we know that hip and knee replacements reduce pain and suffering. However at the health system level, given all the competing priorities, what is the consequence of putting more and more resources into knee replacements?

The complexity of the story told in this report is intensified by the fact that 14 such reports from other jurisdictions (provinces, territories and the federal government) are also released at the same time.

Improved reporting on health system performance is one of the goals of producing this report. However, many of the measures need further development, and the report is lengthy and complex. Due to the complexity of selected measures, the technical nature of the reporting requirements and the sheer volume of the report the benefits of public reporting may be only partially met in this first comparable indicators report.

To make the report more accessible and useable for all readers, The Saskatchewan Comparable Health Indicators Report is organized around five chapters each telling a story about the health of Saskatchewan residents and about selected health services:
- Chapter 1: A Story about Health Status
- Chapter 2: A Story about Personal Health Practices
- Chapter 3: A Story about Public Health
- Chapter 4: A Story about Select Diseases
- Chapter 5: A Story about Health Services

Within each chapter a number of indicators that tell a piece of the story are provided. Wherever possible the discussion of each indicator includes rates and trends, distributions by age and sex and provincial and international comparisons. The report presents the information in several forms, including graphs, charts and text. Technical specifications for each indicator, the rationale and relevance of each indicator are provided in appendices at the end of the report.

CHAPTER 1: A STORY ABOUT HEALTH STATUS

Health status is often presented as a list of pathological conditions and health problems that can be described from a medical view of health. There are two parts to this: subjective health status and objective health status.

Subjective health status is the assessment made by an individual about his/her own health or well-being. In addition to an overall assessment of the health status of a person, this dimension of health status, allows access to crucial information on pathological conditions that have not given rise to consultations with health care professionals, diagnosis or use of health services.[1] In addition, the only way to collect information on good health and health behaviours is through survey-based questions to individuals. Chapter one starts by looking at the subjective aspect of health status, focusing on the percentage of Saskatchewan people self-reporting their health as very good or excellent.

Objective health status is usually based on the opinion of a health professional qualified to make a diagnosis or establish the presence of a health problem. This aspect of health status can be sub-divided into length of life, functional health, diseases or health problems and deaths. The second part of chapter one looks at the objective aspect of health status, focusing on life expectancy (length of life), disability-free life expectancy (functional health), low birth weight (health problems) and infant mortality (deaths)

1.1 Self-Reported Health Status: How do people feel about their health?

One way to measure a person's health status or well-being is to ask the individual to rate his or her own health. An individuals' rating of health is a summary of how they feel about both their physical and mental health according to their values. This measure allows an individual to assess positive health as more than just the absence of health problems.[2]

Although 'self-reported health' is a subjective measure, it is a reliable predictor of more "objectively" measured health problems, such as functional health status (i.e. abilities required to perform daily tasks), conditions that limit participation in daily activities, and chronic conditions (i.e. last for at least 6 months)[3].

For this report, we will use information on self-reported health that was collected through the Canadian Community Health Survey (CCHS) and the National Population Health Survey (NPHS) both conducted by Statistics Canada with significant provincial and territorial advice. This data was collected using a five point reporting scale, ranging from excellent to poor. However, for the purposes of this report we will focus on the percentage of the population age 12+ who report that their health as very good or excellent. [See Appendix A for more details]

Limitations

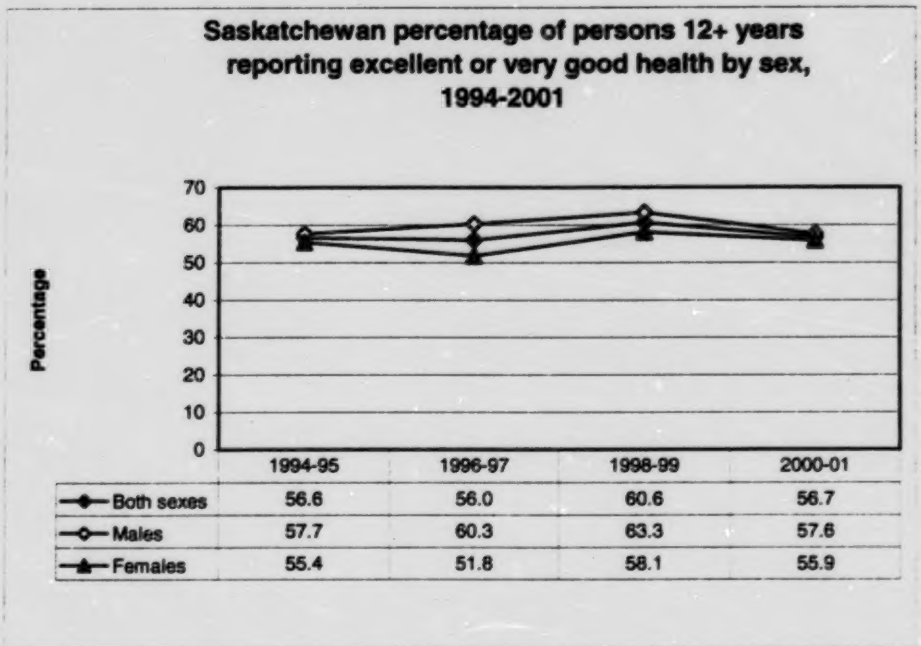
There are a number of limitations associated with self-reported health information. The most obvious limitation is that the definition of health is left up to the individual, as a result the definition itself will differ from one person to another.[4] This limitation becomes even more pronounced when cultural and gender differences are taken into consideration. Studies have shown that there are major cultural differences in the subjective assessment of health, with some cultures focusing their assessment exclusively on physical health and others adopting a more encompassing definition to include mental and spiritual well-being. Furthermore, men are more inclined to report a more positive assessment of health status, causing the measure of positive health for men to be overstated.[5]

In addition to the limitations mentioned above, there are also technical issues around the organization and presentation of the survey that may impact on an individual's self-assessment. For example, survey responses are particularly sensitive to how data are collected, therefore an individual may answer the self-reported health question differently based on whether they are completing a self-administered questionnaire or replying to a telephone survey. Furthermore, the order that the questions are presented may impact on how an individual responds to a question.[6]

Trends

Approximately 57 per cent of Saskatchewan residents, male and female, aged 12 years and older, rated their health as excellent or very good, the same as in 1994-95. There have only been minor fluctuations, over the past 8 years, in how Saskatchewan people report their health.

Figure 1 Self-reported Health: Saskatchewan Trend, 1994-2001



Source: Canadian Community Health Survey- Cycle 1.1 - 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

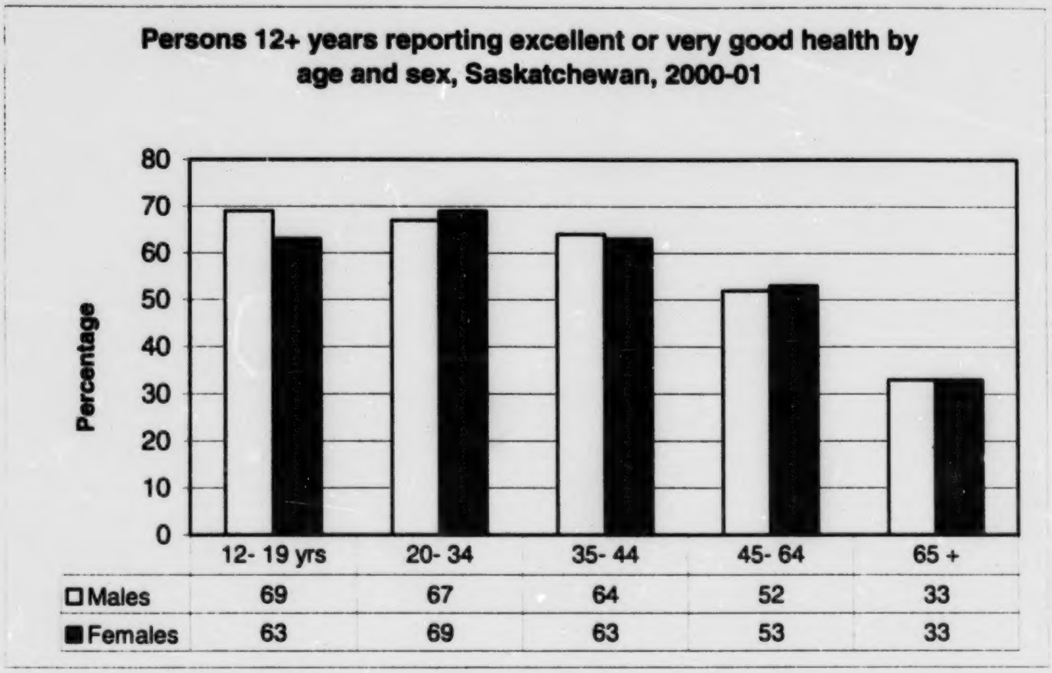
Age and Sex

An individual's perception of her or his health is strongly associated with the individual's age, sex, marital status and socio-economic circumstances. As a result, the proportion of persons who do not see themselves as being in good health is typically higher for women, the elderly, persons of a lower socio-economic level, individuals with less education and married persons.[7]

With respect to the most recent information (2000-01), the older Saskatchewan residents were, the less likely they were to report their health as excellent or very good. In Saskatchewan, approximately 66 per cent of the people interviewed between the ages of 12 to 19 rated their health as excellent or very good, compared to those in the 35 to 44 age group (63 per cent), and those 65 years and older (33 per cent).

Saskatchewan males were more likely, than their female counterparts, to rate their health as excellent or very good, however, differences are seen when comparisons are made on the basis of age groups. For example, both males and females had comparable ratings of their own health as being excellent or very good in the 45 to 64 and 65 and older age groups. While more males than females rated their health as excellent or very good in the 12 to 19, and again slightly more so in the 35 to 44 age groups, fewer males than females rated their health as excellent or very good in the 20 to 34 age group. During the same period a similar pattern of self-reported health status among Canadians, on a national basis, was evident. [See Appendix C – Figure I]

Figure 2 Self-reported Health: Age and gender distribution, Saskatchewan, 2000-01



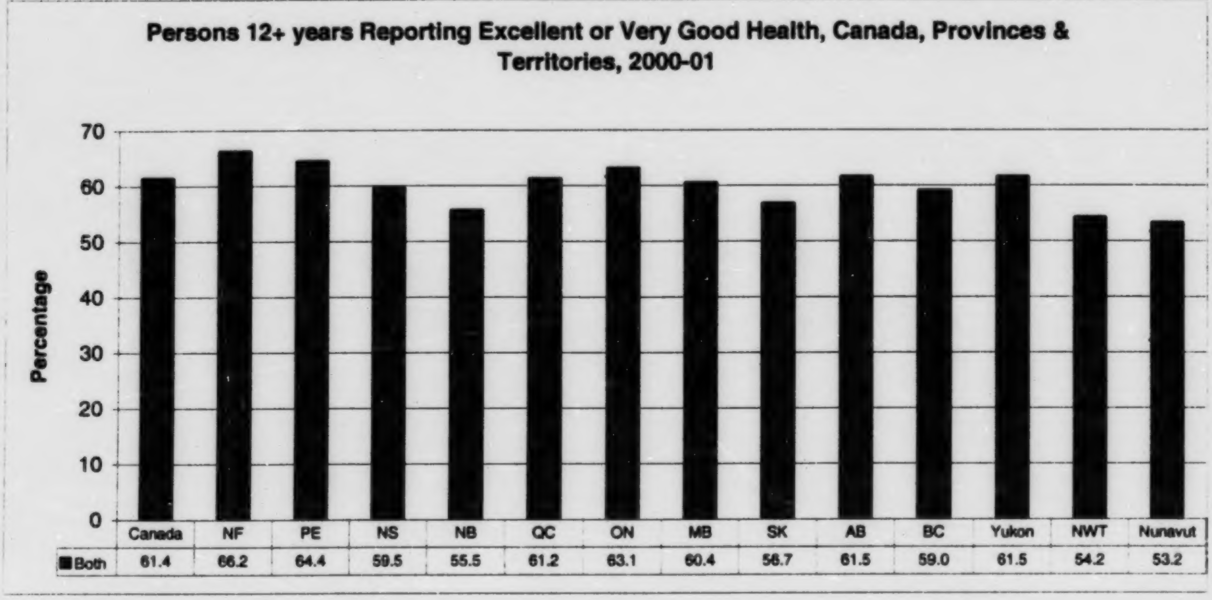
	12- 19 yrs	20- 34	35- 44	45- 64	65 +
☐ Males	69	67	64	52	33
■ Females	63	69	63	53	33

Source: Canadian Community Health Survey- Cycle 1.1 - 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

Provincial/Territorial Comparisons

In 2000-01, more than one half (57 per cent) of Saskatchewan residents aged 12 years and older reported their health as excellent or very good, compared to 66 per cent of Newfoundland, 65 per cent of Prince Edward Island residents and 61% nationally. Differences between males and females ratings of their health as excellent or very good were small (See Appendix C – Figure II].

Figure 3 Self-reported Health: Provincial Comparison, 2000-01



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
■ Both	61.4	66.2	64.4	59.5	55.5	61.2	63.1	60.4	56.7	61.5	59.0	61.5	54.2	53.2

Source: Canadian Community Health Survey- Cycle 1.1 - 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

Canadian data from the 1994 National Population Health Survey (NPHS) revealed that, married individuals are more likely than unmarried individuals to report their health as very good or excellent. Interestingly, the only time that this trend does not hold true is for those people over the age of 75. People aged 75 and over who were never married, divorced, separated or widowed, were slightly more likely to rate their health as very good or excellent compared to those who were married. An analysis of the NPHS also highlights important sex differences in the marriage-health relationship. That is, married men are more likely than married women to report their health as very good or excellent. In contrast, unmarried women are more likely to report their health as very good or excellent compared to unmarried men.[8]

Self-rated health status corresponds with one's level of income adequacy. For example, among Canadians in the lowest income level, 47% rated their health as excellent or very good and 21% described their health as fair or poor.[9] Among Canadians in the highest income level, 73% described their health as excellent or very good, while 5% rated their health as fair or poor.[10] Canadians who lived in the lowest income households were four times more likely to report fair or poor health than those who lived in the highest income households.[11]

There is extensive literature illustrating the income-health link. People who make more money tend to report their health as very good or excellent. There are a variety of explanations that have been put forward to provide reasons for this link. One of the key factors may be that income represents an intervening variable between education and health. Another may be that income has been related to the same lifestyle risk factors (i.e., exercise, nutrition and smoking) as education.[12]

Self-reported health status also corresponds with other health measures. For example, the 1996-97 National Population Health Survey highlighted how provincial differences in self-reported health corresponded with the risk of depression, two-week disability days (i.e. health problems experienced in the previous 14 days which have impacted on regular activity) and psychological well-being. In way of illustration, the survey found that Nova Scotians were the most likely to see their health status as fair (10%), and were also found to have high rates of the risk of depression and two-week disability days, and the lowest rates of psychological well-being.[13]

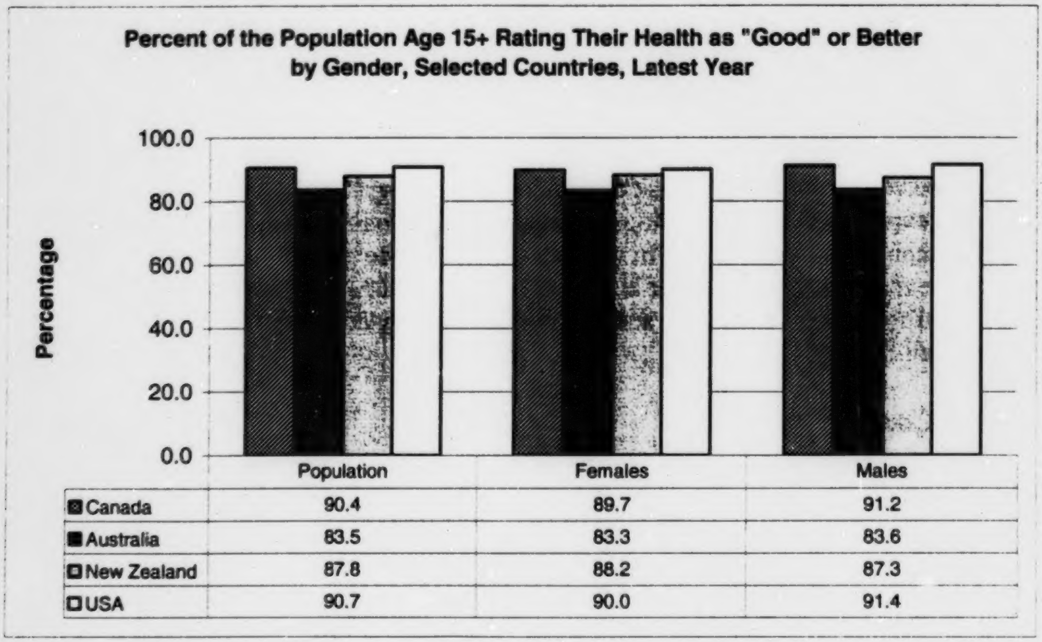
International Comparisons

Although recent estimates of self-reported health status are available for 21 of the 23 OECD countries, international comparisons are based on data from four: Australia, New Zealand, USA, and Canada. Data from these countries are based on large population health surveys and were methodologically similar in terms of the self-reported health question that was asked and the response categories that were available (e.g., 'Would you say your health is excellent, very good, good, fair or poor?' OECD, 2001). The considerable differences in methodology between other countries and across time, limit the comparability of estimates from other nations. Data are based on the most recent reports for each country: Australia 1995, New Zealand, 1997, Canada and USA, 1998. Caution should also be noted when comparing international differences with data from each country individually with respect to the total age range used. Data are based on the percentage of the population aged 15+ years in the international data set (OECD, 2001), which differs from that used to determine Canadian national and provincial averages (ages 12+ years).

Canada and the USA had a higher percentage of the population 15 years of age and older who report their health status as 'good' or better (90.4% and 90.7% respectively). This was somewhat higher than reported rates of 'good' health in New Zealand (87.8%), and, to a greater extent, Australia (83.5%). These differences in self-reported health status appear to hold regardless of gender. Indeed, very little difference in 'good' or better health status exists between the self-reports of males and females in any of the four countries.

Differences in the age ranges can introduce variability in the percentage rates reporting excellent or very good health on the basis of age divisions. With respect to age, individuals of all ages in Canada and the USA appear to report more satisfaction with their health status than those living in New Zealand or Australia. [See Appendix C – Figure III]

Figure 4 Self-reported Health: International Comparison



Percent of the Population Age 15+ Rating Their Health as "Good" or Better by Gender, Selected Countries, Latest Year

	Population	Females	Males
▨ Canada	90.4	89.7	91.2
■ Australia	83.5	83.3	83.6
□ New Zealand	87.8	88.2	87.3
□ USA	90.7	90.0	91.4

Source: Organization for Economic Cooperation and Development

1.2 Health Status

There are many ways to assess health status using objective measures. These include life expectancy (length of life), disability-free life expectancy (functional health), low birth weight (health problems) and infant mortality (deaths).

Life expectancy is a basic, reliable indicator of the overall health of a population. This measure is widely used, is an internationally accepted measure of health status and allows for accurate comparisons over time and between jurisdictions. For the purposes of this report we will focus on two life expectancy measures: life expectancy at birth and life expectancy at age 65.

Disability-Free Life Expectancy (DFLE) is a functional health status measure that is increasingly used to complement the conventional life expectancy measures. The DFLE measure was developed to reflect the fact that not all years of a person's life are typically lived in perfect health. Chronic disease, frailty, and disability tend to become more prevalent at older ages, so that a population with a higher life expectancy may not be healthier.

Indeed, a major question with an aging population is whether increases in life expectancy will be associated with a greater or lesser proportion of the future population spending their years living with disability. If DFLE is increasing more rapidly than life expectancy in a population, then not only are people living longer, they are also living a greater portion of their lives free of disability.

Low birth weight is an indicator of the general health of newborns, and a key determinant of infant survival, health and development. Low birth weight infants are at a greater risk of dying during the first year of life, and if they survive, they have a greater risk of disability and diseases such as cerebral palsy, visual problems, learning disabilities and respiratory problems. Low birth weight is associated with poor maternal health, lifestyle and economic circumstances.

(a) Life expectancy

Life expectancy at birth is the number of years a person is expected to live, starting from birth. Life expectancy at age 65 is the average number of additional years a person who has reached the age of 65 can expect to live. [See Appendix A]

Life expectancy is not the number of years a particular newborn (or individual currently age 65) can actually expect to live. The reason is that only death rates for the observation period (e.g. 1998) are used, and these are averages for the entire population.

Historically, mortality rates in Canada have been falling. As a result life expectancy estimates for the population are increasing. However, individuals' life circumstances vary. As a result, if an individual had been a long time smoker, or had a family history of disease, these factors could contribute to a shorter life for the individual.

Limitations

While life expectancy at birth and life expectancy at age 65 are consistent and comparable measures over time, they are not very sensitive. These measures will not vary much from year to year, or from jurisdiction to jurisdiction in response to events or health system changes.

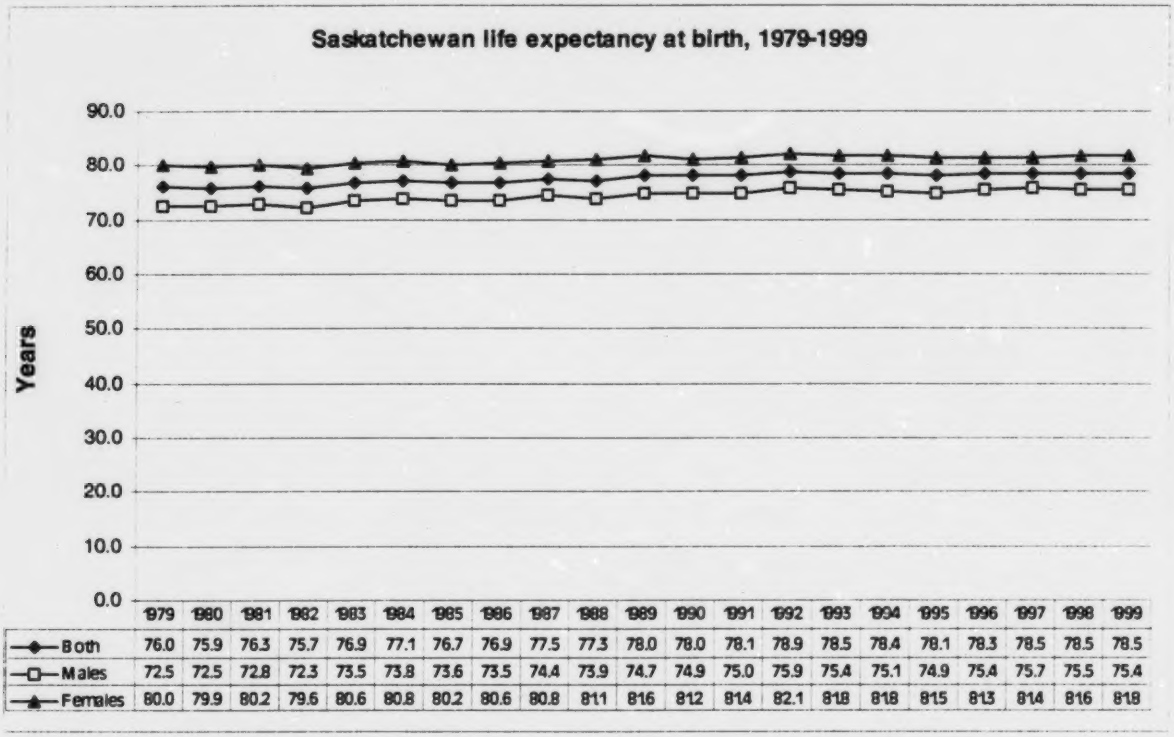
In addition, life expectancy as a global health status measure is dependent on many circumstances beyond the performance of the health system and the appropriateness of health services. The determinants of health are well documented and include the social and physical environments, personal health practices, biology, genetics and health services. In this vein, the health system cannot take full credit for the measure of longevity although it should not be absolved completely either.

Another principle weakness of these indicators is that they measure “quantity” rather than “quality” of life. Length of life does not take into consideration quality of life and in fact as we live longer as a population we may live longer in a state of activity limitation or disability – i.e. a lower quality of life.

Trend

Life expectancy at birth and at age 65 increased in Saskatchewan between 1979 and 1999. Life expectancy at birth increased 2.5 years to 78.5 years and life expectancy at age 65 increased by 0.6 years to 18.6 years over this time period.

Figure 5 Life Expectancy at Birth: Saskatchewan Trend, 1979-99

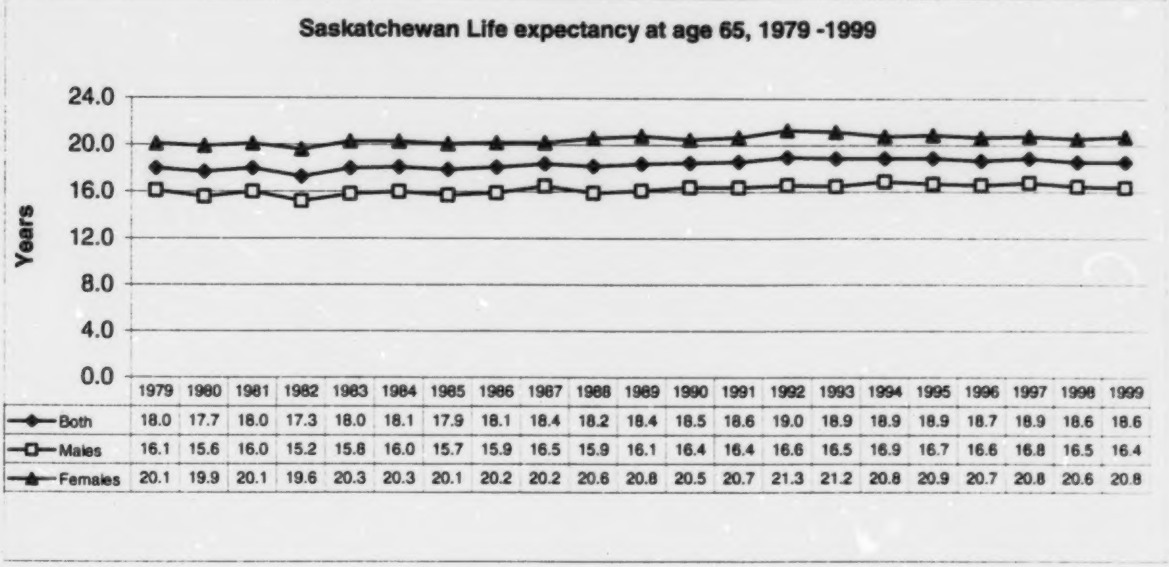


Saskatchewan life expectancy at birth, 1979-1999

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both	76.0	75.9	76.3	75.7	76.9	77.1	76.7	76.9	77.5	77.3	78.0	78.0	78.1	78.9	78.5	78.4	78.1	78.3	78.5	78.5	78.5
—□— Males	72.5	72.5	72.8	72.3	73.5	73.8	73.6	73.5	74.4	73.9	74.7	74.9	75.0	75.9	75.4	75.1	74.9	75.4	75.7	75.5	75.4
—▲— Females	80.0	79.9	80.2	79.6	80.6	80.8	80.2	80.6	80.8	81.1	81.6	81.2	81.4	82.1	81.8	81.8	81.5	81.3	81.4	81.6	81.8

Source: Statistics Canada, Vital Statistics, Death Database and Demography Division (population estimates).

Figure 6 Life Expectancy at age 65: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both	18.0	17.7	18.0	17.3	18.0	18.1	17.9	18.1	18.4	18.2	18.4	18.5	18.6	19.0	18.9	18.9	18.9	18.7	18.9	18.6	18.6
—□— Males	16.1	15.6	16.0	15.2	15.8	16.0	15.7	15.9	16.5	15.9	16.1	16.4	16.4	16.6	16.5	16.9	16.7	16.6	16.8	16.5	16.4
—▲— Females	20.1	19.9	20.1	19.6	20.3	20.3	20.1	20.2	20.2	20.6	20.8	20.5	20.7	21.3	21.2	20.8	20.9	20.7	20.8	20.6	20.8

Source: Statistics Canada, Vital Statistics, Death Database and Demography Division (population estimates).

Sex

Women continue to enjoy longer life expectancy than their male counterparts. Between 1979 and 1999, life expectancy at birth increased 2.9 years for males to 75.4 years and 1.8 years for females to 81.8 years. However, the gap in life expectancy between the sexes continues to narrow. A female born in 1979 could expect to live 7.5 years longer than her male counterpart, while a female born in 1999 will live approximately 6 years longer than males born at the same time.

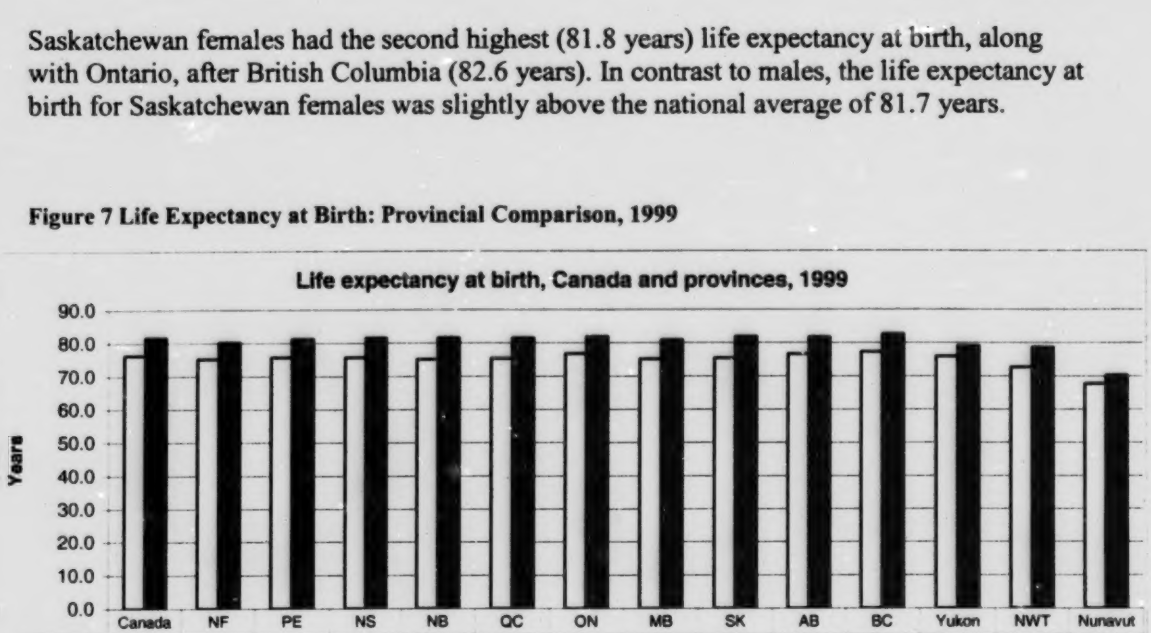
Between 1979 and 1999, life expectancy at age 65 increased 0.3 years for men to 16.4 and 0.7 years for women to 20.8. The difference in life expectancy at age 65, between men and women, remained at approximately 4 years during this time period. So, where the life expectancy at age 65 increased for both sexes, the gap between the sexes remained unchanged.

Provincial/Territorial Comparisons

Saskatchewan residents have similar life expectancy to most Canadians. In 1999, in the majority of provinces, life expectancy at birth for males and females was approximately 76 years and 82 years, respectively. Saskatchewan males had the sixth highest (75.4 years) life expectancy at birth. British Columbia had the longest life expectancy (77.3 years). The life expectancy at birth for Saskatchewan males in 1999 was below the national average of 76.3 years.

Saskatchewan females had the second highest (81.8 years) life expectancy at birth, along with Ontario, after British Columbia (82.6 years). In contrast to males, the life expectancy at birth for Saskatchewan females was slightly above the national average of 81.7 years.

Figure 7 Life Expectancy at Birth: Provincial Comparison, 1999

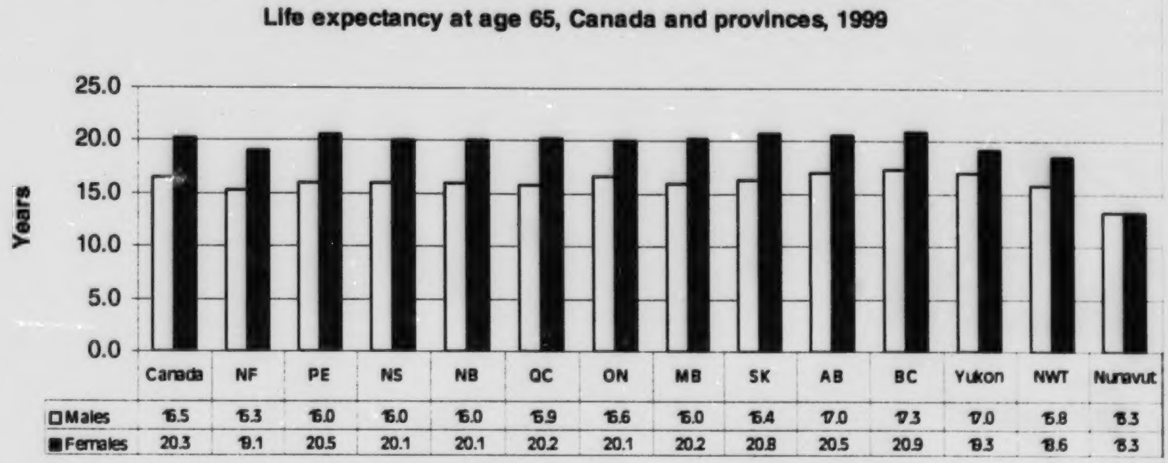


	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
☐ Males	76.3	75.2	75.7	75.7	75.1	75.4	76.8	75.1	75.4	76.6	77.3	75.9	72.6	67.7
■ Females	81.7	80.2	81.2	81.6	81.6	81.5	81.8	80.8	81.8	81.7	82.6	79.0	78.6	70.2

Source: Statistics Canada, Vital Statistics, Death Database and Demography Division (population estimates).

The life expectancy at age 65 across provinces was similar in 1999. Among the provinces in 1999, females in Saskatchewan (20.8 years) had the second highest life expectancy at age 65 after British Columbia, and Saskatchewan males (16.4 years) had the fourth highest life expectancy at age 65 after Alberta, the Yukon Territory and British Columbia. The life expectancy at age 65 for both Saskatchewan males and females in 1999 was above the national averages of 16.5 years and 20.3 years, respectively.

Figure 8 Life Expectancy at age 65: Provincial Comparison, 1999



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
☐ Males	16.5	15.3	16.0	16.0	16.0	15.9	16.6	16.0	16.4	17.0	17.3	17.0	15.8	13.3
■ Females	20.3	19.1	20.5	20.1	20.1	20.2	20.1	20.2	20.8	20.5	20.9	19.3	18.6	13.3

Source: Statistics Canada, Vital Statistics, Death Database and Demography Division (population estimates).

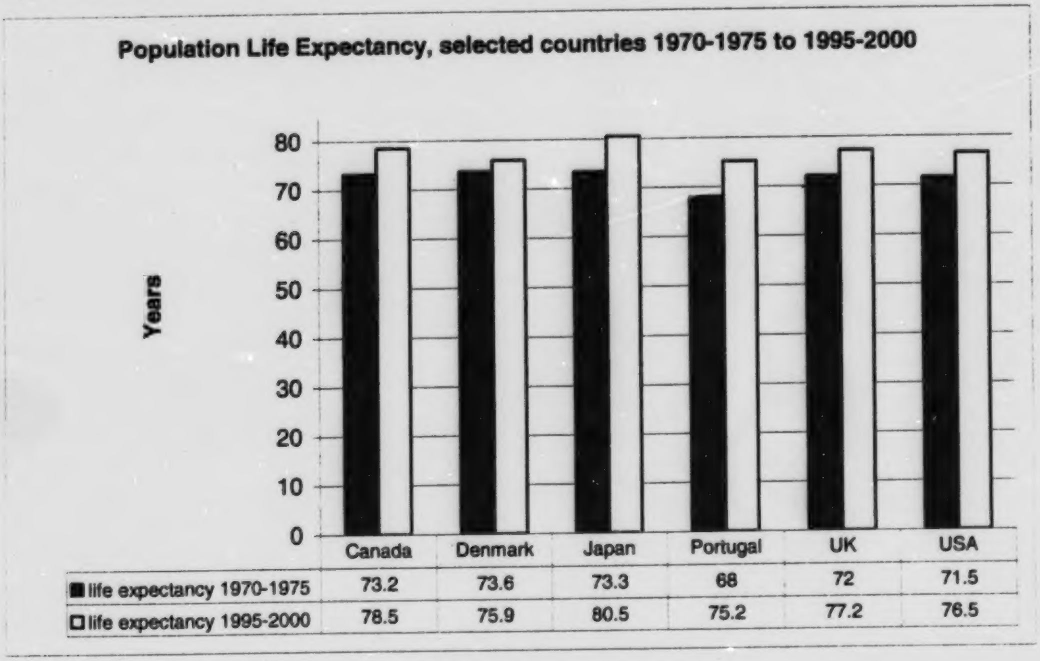
While it is true that most Canadian jurisdictions report similar life expectancy estimates some important variations are hidden in the presentation of provincial estimates. *Toward a Healthy Future: Second Report on the Health of Canadians, 1999* cites a 1991 study which shows that Canadian men in the highest quarter of the income distribution can expect to live 6.3 years longer that those in the lowest quarter. The difference for women is 3.0 years. Further this report states that life expectancy of First Nations people in 1990 was 7 years less than the 1991 Canadian average.[14]

These variations in life expectancy speak to the importance of the determinants of health in determining longevity. First Nations Peoples and northern communities appear to have significantly lower life expectancy while southern service areas have longer life expectancy.

International Comparisons

Comparisons between Canada and other member countries of the OECD highlight changes in life expectancy from 1970-1975 to 1995-2000. The increase in life expectancy experienced in Canada (5.3 years) is comparable to that recorded for the UK (5.2 years) and the USA (5.0 years). Consequently Canadian life expectancy in 1995-2000 is higher than that found in either the UK or USA in the same time period, but is also higher than the average life expectancy in Portugal. Portugal experienced the largest increase in life expectancy (7.2 years) over this time period, however it is still lower than that of many member states. Japan is highlighted as not only showing one of the largest increments in life expectancy between 1970-1975 and 1995-2000, but also as having the highest life expectancy rate of any OECD member. Life expectancy in Denmark appeared to change minimally from 1970-1975 to 1995-2000. Although starting from a similar base rate as Denmark, Canadian rates of life expectancy are seen to rise considerably over time in comparison.

Figure 9 Life Expectancy at Birth: International Comparison



	Canada	Denmark	Japan	Portugal	UK	USA
■ life expectancy 1970-1975	73.2	73.6	73.3	68	72	71.5
□ life expectancy 1995-2000	78.5	75.9	80.5	75.2	77.2	76.5

Source: Organization for Economic Cooperation and Development

(b) Disability-free life expectancy

For the purposes of this report we will focus on disability-free life expectancy at birth and disability-free life expectancy at age 65. Disability-free life expectancy at birth is the number of years an average individual would be expected to live, starting from birth, free of moderate or severe disability. Disability-free life expectancy at age 65 is the average number of additional years a person who has reached the age of 65 would expect to live free of moderate or severe disability. [See Appendix A]

Limitations

Limitations associated with DFLE are much the same as for life expectancy. For example although the DFLE measures are reliable and comparable, they are not very sensitive, and are not likely to change substantially from year to year or from jurisdiction to jurisdiction in response to events or health system changes.

In addition, DFLE as a global health status measure is dependent on many circumstances beyond the performance of the health system and the appropriateness of health services. The determinants of health are well documented and include the social and physical environments, personal health practices, biology, and genetics and health services. In this vein the health system can take very little credit or blame for the level of DFLE, although it should not be absolved completely.

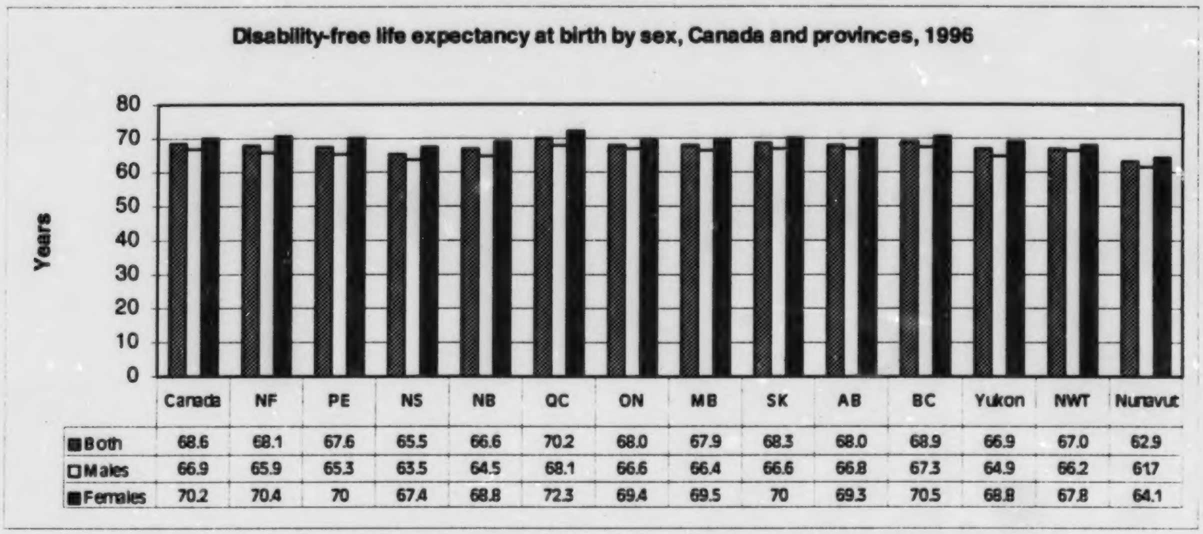
Furthermore, wide confidence intervals indicate high variability, thus, these numbers should be interpreted and compared with caution

Sex

Saskatchewan's disability-free life expectancy at birth (68.3 years) in 1996 was similar to the national average of 68.6 years. In Saskatchewan and at the national level, females had higher disability-free life expectancy than males.

Out of all the provinces, Saskatchewan males (66.6 years) had similar DFLE at birth as several other provinces including Ontario, and Alberta. Similarly, DFLE at birth for Saskatchewan females (70 years) was comparable to Newfoundland (70.4 years), and British Columbia (70.5 years).

Figure 10 Disability Free Life Expectancy at Birth, Provincial Comparison, 1996

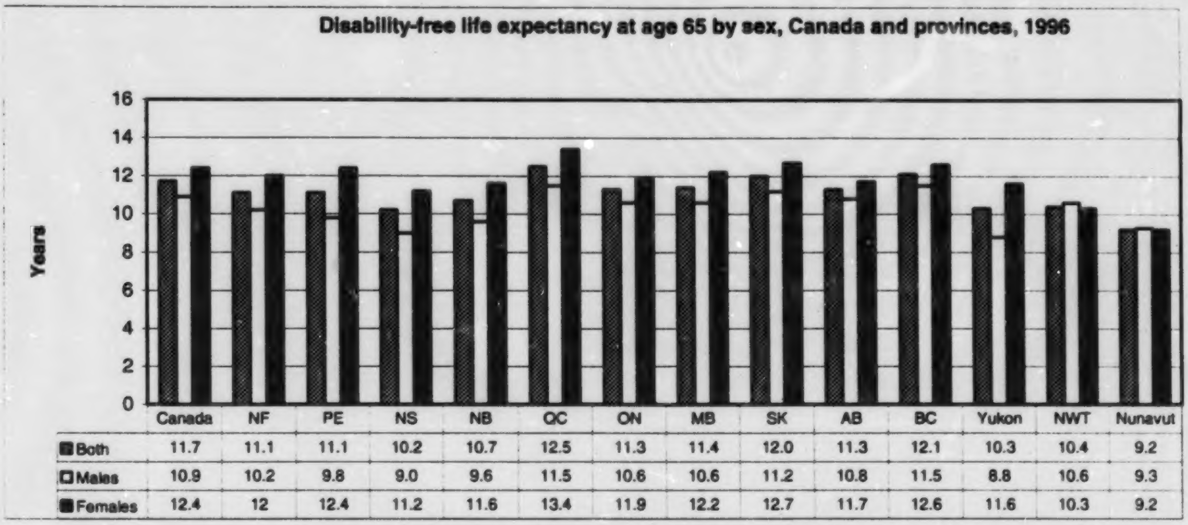


	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	68.6	68.1	67.6	65.5	66.6	70.2	68.0	67.9	68.3	68.0	68.9	66.9	67.0	62.9
☐ Males	66.9	65.9	65.3	63.5	64.5	68.1	66.6	66.4	66.6	66.8	67.3	64.9	66.2	61.7
■ Females	70.2	70.4	70	67.4	68.8	72.3	69.4	69.5	70	69.3	70.5	68.8	67.8	64.1

Source: Statistics Canada, Vital Statistics, Death Database and Demography division (population estimates), and the 1996 Census (20% sample).

Out of all the provinces, Saskatchewan males had the third highest (11.2 years) DFLE at age 65 after British Columbia (11.5 years) and Quebec (11.5 years). Saskatchewan females had the second highest (12.7 years) DFLE at age 65, after Quebec where an extra 13.4 years of disability free years can be expected after the age of 65. Saskatchewan disability-free life expectancy at age 65 for both male and female were above the national averages of 10.9 years and 12.4 years, respectively.

Figure 11 Disability Free Life Expectancy at Age 65, Provincial Comparison, 1996



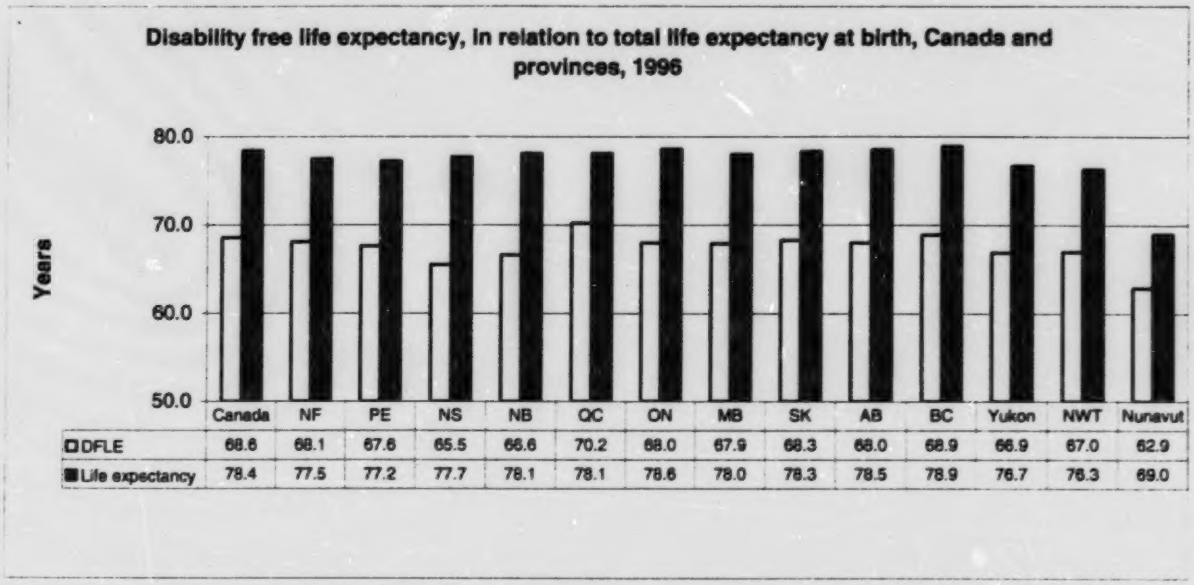
	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	11.7	11.1	11.1	10.2	10.7	12.5	11.3	11.4	12.0	11.3	12.1	10.3	10.4	9.2
☐ Males	10.9	10.2	9.8	9.0	9.6	11.5	10.6	10.6	11.2	10.8	11.5	8.8	10.6	9.3
■ Females	12.4	12	12.4	11.2	11.6	13.4	11.9	12.2	12.7	11.7	12.6	11.6	10.3	9.2

Source: Statistics Canada, Vital Statistics, Death Database and Demography division (population estimates), and the 1996 Census (20% sample).

Provincial/Territorial Comparisons

In 1996, Saskatchewan had the third highest (12.0 years) DFLE at 65 years after British Columbia (12.1 years) and Quebec (12.5 years). What this means, is that once a person in Saskatchewan has reached the age of 65 without a disability, they can expect to live another 12 years disability-fee, a difference of 0.3 years over the Canadian national average. DFLE is presented below in relationship to overall life expectancy.

Figure 12 Disability Free Life Expectancy / Life Expectancy: Provincial Comparison, 1996



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
☐ DFLE	68.6	68.1	67.6	65.5	66.6	70.2	68.0	67.9	68.3	68.0	68.9	66.9	67.0	62.9
■ Life expectancy	78.4	77.5	77.2	77.7	78.1	78.1	78.6	78.0	78.3	78.5	78.9	76.7	76.3	69.0

Source: Statistics Canada, Vital Statistics, Death Database and Demography division (population estimates), and the 1996 Census (20% sample).

Note: Life expectancy for the Yukon, NWT and Nunavut should be interpreted with caution due to a small underlying count.

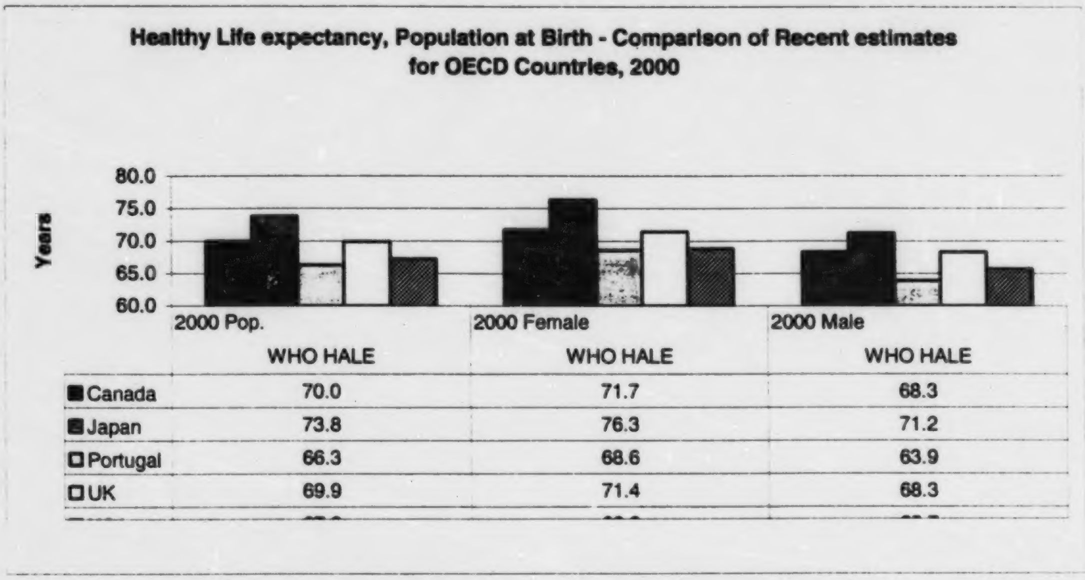
In Saskatchewan, the average DFLE estimates at birth and at age 65 are comparable to the national average and to most other jurisdictions.

International Comparison

The World Health Organization (WHO) Health Adjusted Life Expectancy (HALE) estimates are used, as recommended by the OECD (2001) as the most comprehensive and accurate disability free estimates currently available. Unlike the OECD 2001 estimates, which are based on countries' own definitions of disability, in which considerable variation exists, these estimates include all the countries that are similar to Canada in terms of standard of living (OECD 23). The WHO-HALE 2000 is also regarded as having none of the methodological weaknesses that the earlier version (WHO-DALE, 1999 - Disability Adjusted Life Expectancy) had. HALE is based on life expectancy at birth but includes an adjustment for time spent in poor health. It is most easily understood as being equivalent to the number of years a new-born can expect to live in good health based on current rates of ill-health and mortality (International Health Indicators CD-ROM).

Based on comparisons for the total population, Canada appears to be somewhat similar to the other countries in the OECD 23. With respect to the highest (Japan), and the lowest (Portugal) estimates of disability free life expectancy, Canadian rates are around the average of all 23 member OECD countries, and indeed are higher than expected disability free life as recorded for the United States (67.2 years), our closest geographical neighbour. Canadian rates of DFLE appear to be most similar to the UK (69.9 years), which has a comparable healthcare system.

Figure 13 Disability Free Life Expectancy: International Comparison



	WHO HALE	WHO HALE	WHO HALE
■ Canada	70.0	71.7	68.3
▨ Japan	73.8	76.3	71.2
☐ Portugal	66.3	68.6	63.9
☐ UK	69.9	71.4	68.3

Source: Organization for Economic Cooperation and Development

As is found in Canada, female rates of DFLE are higher consistently than those found for men, regardless of country of origin. This discrepancy appears to be largest in Japan, with an estimated difference of 5.1 years between males and females being recorded. This is somewhat larger than that between males and females in Canada, where female rates of DFLE exceed males by only 3.4 years.

(c) Low birth weight

Low birth weight (LBW) is measured as the proportion of live births that fall between 500 and 2,499 grams. [See Appendix A] Low birth weight is an indicator of the general health of newborns, and a key determinant of infant survival, health and development. Low birth weight infants are at a greater risk of dying during the first year of life, and if they survive, they have a greater risk of disability and diseases such as cerebral palsy, visual problems, learning disabilities and respiratory problems. Low birth weight is associated with poor maternal health, lifestyle and economic circumstances. It is also associated with multiple births and assisted conception.

According the *Statistical Report on the Health of Canadians*[15], the weight of infants at birth is a principal determinant of both their survival and their health in childhood. Low birth weight can result in mental and physical disabilities, and sometimes death. For example, in

1996, 5.7% of all live births in Canada resulted in low birth weight babies (a total of 21,025 babies). More than half of low birth weights are due to premature births (before the 37th week of gestation); the rest are due to lack of nourishment *in utero*, pregnancy-induced hypertension and/or heavy smoking by the mother during pregnancy.

The *Vital Statistics Compendium, 1996*[16], associates low birth weight with several risk factors, including the mother's smoking behaviour during pregnancy and socio-economic status. Studies have also shown that greater maternal education is associated with a decreased likelihood of low birth weight, regardless of race[17]. Socio-economic status, in turn, is associated with age, diet, marital status and ethnicity. The offspring of unmarried women were more likely to be LBW than those of their married counterparts (6.6% vs. 5.1%), as were the offspring of foreign-born women (6.4%), compared with those of Canadian-born women (5.6%).

Children in low-income families and neighbourhoods are at higher risk for infant death and low birth weight, therefore, good prenatal nutrition and support to pregnant women can help reduce low birth weight and other problems associated with birth[18].

Limitations

This indicator contains a number of limitations for consideration when assessing, comparing or using the data. First, comparability over time and between jurisdictions can be an issue. The different distribution of births can be an issue for comparability depending on both the characteristics of the pregnancy (such as length of gestation) and the expectant women (such as age of mother and socio-economic status).[19]

The comparability of this data across jurisdictions can also be compromised on a pragmatic level. For example, the completeness of data can be an issue when jurisdictions experience time lags between the time of birth and its official registration with vital statistics.

Furthermore, comparability of the data across provinces can be hampered if differences in provincial populations are not taken into consideration. Provinces are made up of people of different ethnicity, age and sex. If adjustments are not made to the data to account for these differences, then the data may not provide accurate information to inform programs and services.

Second, the weight at birth is also associated with premature or pre-term births. Therefore, if one wanted to eliminate the effects of pre-term births on low birth weights, one would need to use only low birth weight infants carried to term (i.e. 37 weeks of gestation or more). In addition, weight at birth is also influenced by twinning, or, multiple births. To eliminate this effect on the birth weight indicator, one would need to exclude multiple births.

Third, the cause-of-death category known as "low-weight infant deaths" is a conglomerate of health problems that may affect the mother, the newborn, or both. While it represents a substantial proportion of infant deaths, it has little value for understanding *preventable* causes of death[20]. A number of studies have suggested new methodologies for coding causes of death in order to focus attention on preventable causes. For example, a new classifications scheme for causes of death might focus on the increasing proportion of deaths that are attributable to premature and less attention might be given toward infectious causes of death, because they now account for a small and decreasing proportion of all infant deaths.

Fourth, the low birth weight measure does not capture the bulk of infant health problems for all of the populations in the province. For example, a 1994 study of infant mortality found substantial differences between Registered Indian infant deaths and infant deaths occurring among other members of the Saskatchewan population. Registered Indian infant deaths tend to occur among younger mothers, have higher birth weights, are less likely to occur in the early days of life, and are more likely to be the result of congenital anomalies, other conditions, or SIDS. On the other hand, infant deaths occurring among the rest of the Saskatchewan population tend to occur to babies of older mothers and are associated with lower birth weights. They are more likely to occur in the early days of life, and are more likely to be due to conditions arising in the perinatal period or to congenital anomalies. This finding may at least partially support the conclusion, that birth weight (and length of gestation) might best be treated as a confounding variable in the analysis of infant deaths, rather than a variable of primary interest.

A focus on birth weight, and on the characteristics of infant mortality that are highly correlated with birth weight may actually draw attention away from important differences in infant mortality across different segments of the population.[21] As a result some jurisdictions prefer to use a broader indicator of "at-risk birth weight." This measure is much more comprehensive in that it includes low birth weights and high birth weights (>4000 grams) and may provide further insights into infant health. High birth weight is becoming recognized as a significant emerging issue for the Aboriginal population and is therefore especially relevant in Saskatchewan with a large proportion of Aboriginal people.

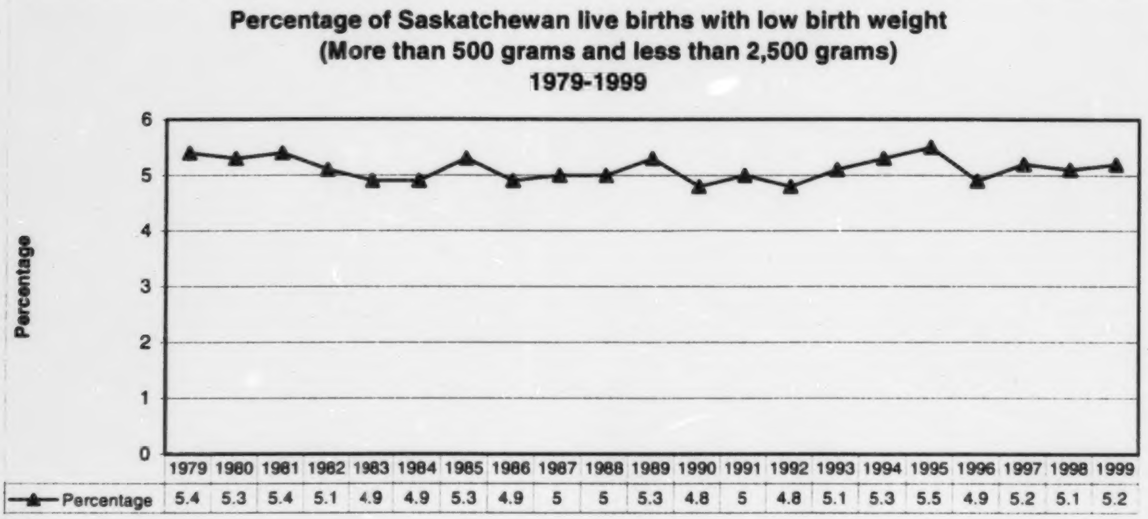
According to the First Nations and Inuit Regional Health Survey, the rate of low birth weight among Aboriginal people in 1996-97 did not differ significantly from national norms in 1994-95. However, the rate of high birth weight was significantly higher (18% vs. 12%). High birth weight is associated with higher neonatal mortality (i.e. death within 28 days or less).

Birth weight among infants who died during the first year of life also varied as a function of Registered Indian status. The average birth weight for Registered Indian infant deaths was 2,596 grams, while for the remainder of infant deaths it was 1,907 grams; this difference is statistically significant. Approximately 23% of LBW infant deaths occurred in the Registered Indian population. More than half of Registered Indian infant deaths (54%) were of normal birth weight, compared to only 32% of infant deaths in the rest of the Saskatchewan population.[22]

Trend

There was little overall change in the Saskatchewan percentage of low birth weight babies between 1979 and 1999, fluctuating between 4.8 per cent and 5.5 percent at its highest and lowest points. The proportion of live low birth weight babies was higher between 1979 and 1982 and in the mid-1990s than in the mid-1980s. For example, in 1995, 5.5 per cent of babies weighed less than 2,500 grams at birth, compared with 4.9 per cent in 1986.

Figure 14 Low Birth Weight: Saskatchewan Trend, 1979-99



Source: Statistics Canada, Vital Statistics, Birth database.

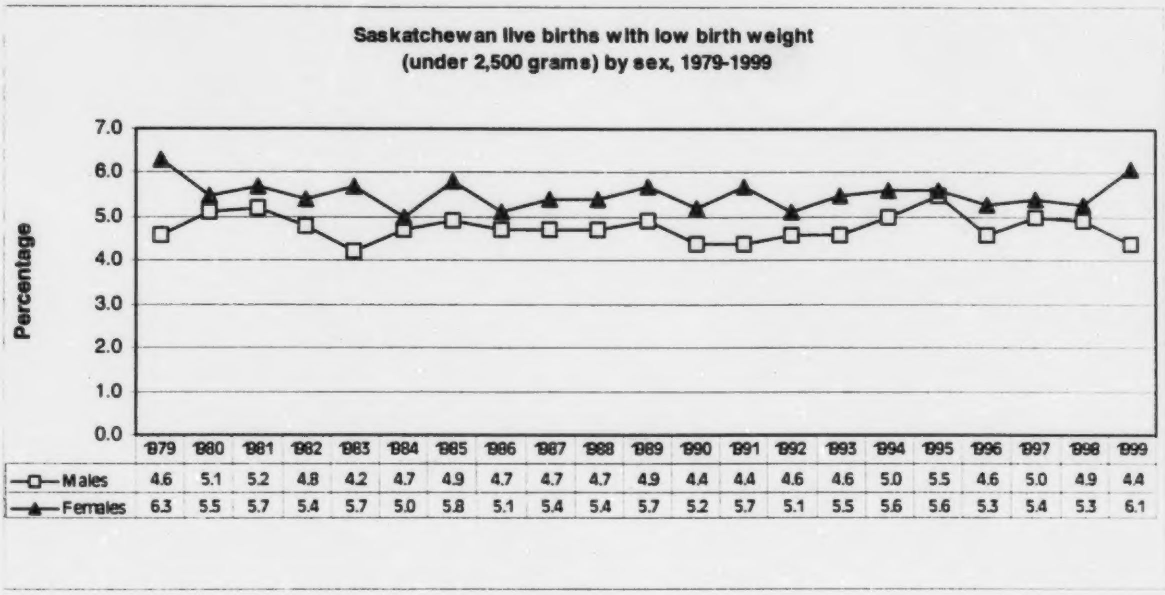
In Saskatchewan, the average birth weight of all infants who died between 1992 and 1997 was 2,142 grams. The majority of infants (53%) who died in this six-year period were of low birth weight babies, while 6% were high birth weight babies. There have been slight changes in the proportion of low birth weight infant deaths across time. For example, in 1992, 46% of deaths were of low weight, compared with 54% in 1995 and 52% in 1997.[23]

A study conducted in 1997 indicates some of the regional differences within Saskatchewan in the incidence of LBW. At 3.7, Swift Current had the lowest proportion of infants with LBW followed by Weyburn at 3.9, putting both well below the provincial (5.1) and national (5.8) averages. Four additional regions in the province were at or below the provincial rate: Melfort (4.2), Prince Albert (4.5), the Northern Health Services Branch (4.7), and Moose Jaw (5.1). Over half of the births in the province, however, occur in the Saskatoon and Regina Service Areas, which had low birth weights of 5.5 and 5.4 respectively. The highest proportion of low birth weights occurred in Rosetown at 5.9.

Sex

Females are more likely than males to be born with a low birth weight. The percentage of male babies born with low birth weight fluctuated from a high of 5.5 per cent in 1995 to a low of 4.2 per cent in 1983. Similarly, female babies born with low birth weight ranged from a high of 6.3 per cent in 1979 to a low of 5.0 per cent in 1984.

Figure 15 Low Birth Weight: Saskatchewan Trend by Sex, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—□— Males	4.6	5.1	5.2	4.8	4.2	4.7	4.9	4.7	4.7	4.7	4.9	4.4	4.4	4.6	4.6	5.0	5.5	4.6	5.0	4.9	4.4
—▲— Females	6.3	5.5	5.7	5.4	5.7	5.0	5.8	5.1	5.4	5.4	5.7	5.2	5.7	5.1	5.5	5.6	5.6	5.3	5.4	5.3	6.1

Source: Statistics Canada, Vital Statistics, Birth database.

Despite these variations on a yearly basis, when a three year running average is done, there are actually, over time, very little changes in the overall percentage of low birth weight babies born in Saskatchewan.[See Appendix C – Figure IV]

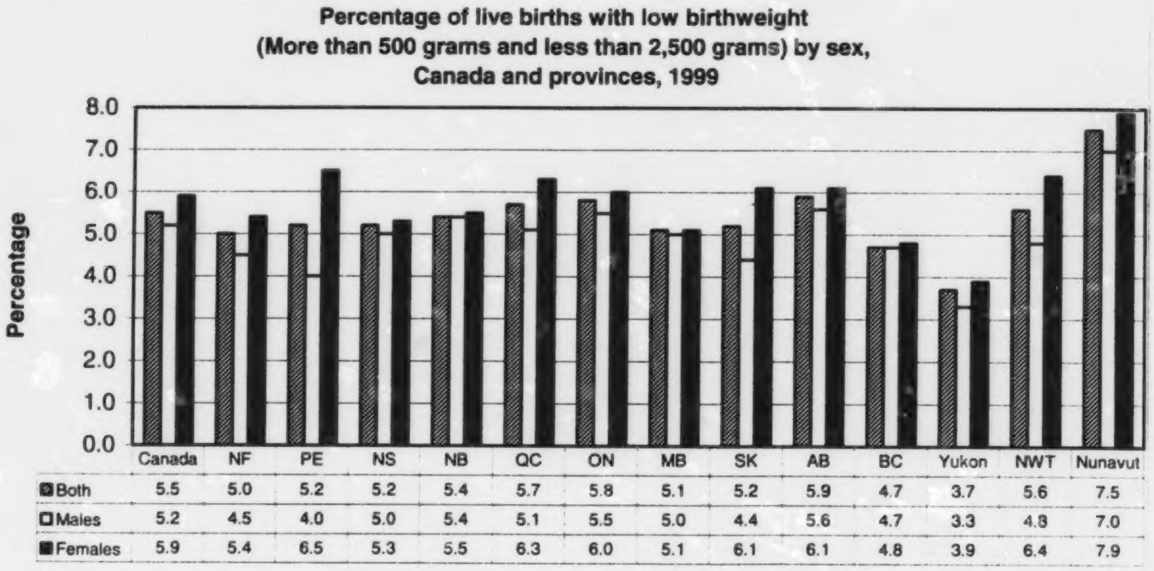
Provincial/Territorial Comparisons

In 1999, the lowest proportion of low birth weight babies was found in British Columbia (4.7 per cent). Saskatchewan, Nova Scotia and Prince Edward Island had the same proportion of low birth weight babies (5.2%).

The lowest proportion of low birth weight males was found in the Yukon (3.3 percent). The Saskatchewan proportion of low birth weight male babies (4.4 per cent) was below the national average of 5.2 per cent.

Saskatchewan had the fifth highest proportion of low birth weight female babies (6.1 percent) bearing in mind the cautions associated with the estimates for Nunavut and the Northwest Territories.

Figure 16 Low Birth Weight: Provincial Comparison, 1999



Percentage of live births with low birthweight (More than 500 grams and less than 2,500 grams) by sex, Canada and provinces, 1999

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	5.5	5.0	5.2	5.2	5.4	5.7	5.8	5.1	5.2	5.9	4.7	3.7	5.6	7.5
☐ Males	5.2	4.5	4.0	5.0	5.4	5.1	5.5	5.0	4.4	5.6	4.7	3.3	4.8	7.0
■ Females	5.9	5.4	6.5	5.3	5.5	6.3	6.0	5.1	6.1	6.1	4.8	3.9	6.4	7.9

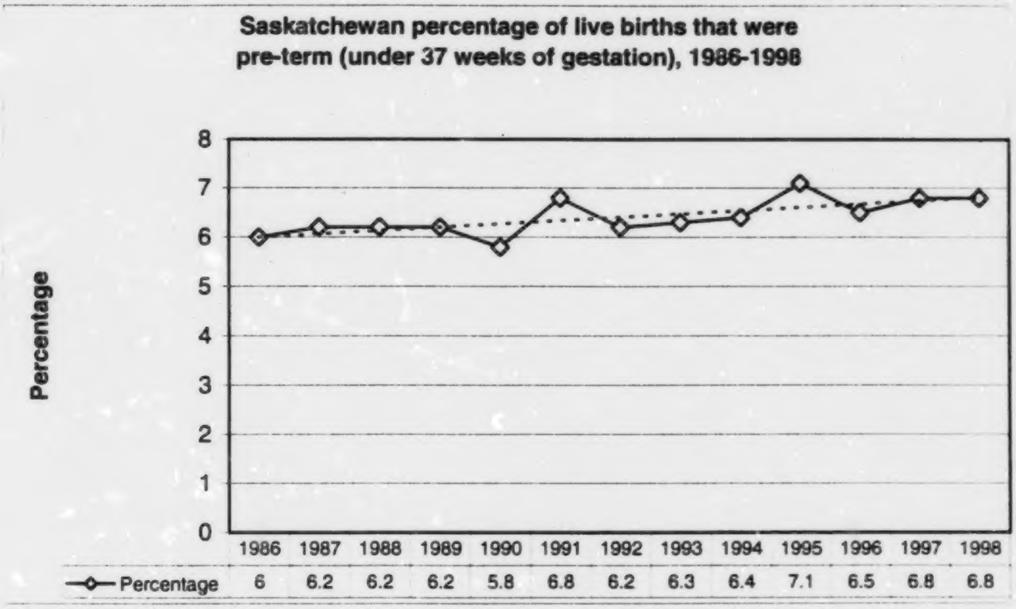
Source: Statistics Canada, Vital Statistics, Birth database.

Note: Data from The Yukon, NWT and Nunavut should be interpreted with caution due to small underlying counts.

Gestation

In Saskatchewan, the proportion of infants born at less than 37 weeks of gestation increased from 6.0 per cent to 6.8 per cent of all live births between 1986 and 1998, an increase of 13 per cent. The lowest and highest percentages of babies born at less than 37 weeks of gestation during the 13-year period were 5.8 per cent in 1990 and 7.1 per cent in 1995.

Figure 17 Low Birth Weight (Pre-term): Saskatchewan Trend, 1986-98



Saskatchewan percentage of live births that were pre-term (under 37 weeks of gestation), 1986-1998

Source: Statistics Canada, Vital Statistics, Birth database.

This increasing trend in premature births may be mainly due to increases in multiple births[i], medical interventions, and improved gestational age estimates based on ultrasonic observations.[24] Also, as a result of changes in birth-registration procedures, births of infants very early during gestation (at less than 22 weeks [early gestation births]) and with extremely low birth weights (under 500 grams) have been registered as live births rather than being registered as stillbirths or left unregistered as miscarriages.

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[i] Despite a declining number of births between 1986 and 1996, the number of multiple birth sets increased 22% nationally (excluding Newfoundland), and 11% in Saskatchewan (Statistics Canada, 1996). As a result, the Canadian multiple birth rate was up to 12.1 per 1,000 deliveries in 1996. Among the provinces, these rates were highest in Ontario (13.1) and British Columbia (12.4) and lowest in Prince Edward Island (7.1) and Manitoba (9.8). Saskatchewan came in at 10.8 per 1,000 deliveries. The use and success of assisted pregnancy techniques may be contributing to the recent trends noted here (Statistics Canada, 1996).

The sociodemographic characteristics of mothers with premature offspring resembled those of mothers with low birth weight babies. For example, 8.3% of births to teenagers were premature, compared with 6.8% of births to women aged 20 to 34. Babies born to unmarried women were more likely to be pre-term (7.9% of births) than those born to their married counterparts (6.4%). However, the offspring of foreign-born mothers were just as likely to be pre-term as those of Canadian-born mothers (both 7.1%). In 1996, a higher proportion of boys than girls were born prematurely: 7.4% of male births, compared with 6.7% of female births (Statistics Canada, 1996).

Saskatchewan statistics reveal a similar strong positive association between birth weight and length of gestation. Between 1992 and 1997, 90% of the pre-term infants who died during the first year of life were low birth weight babies, while only 14% of infants who were carried to full term and subsequently died in the first year of life were low birth weight babies.

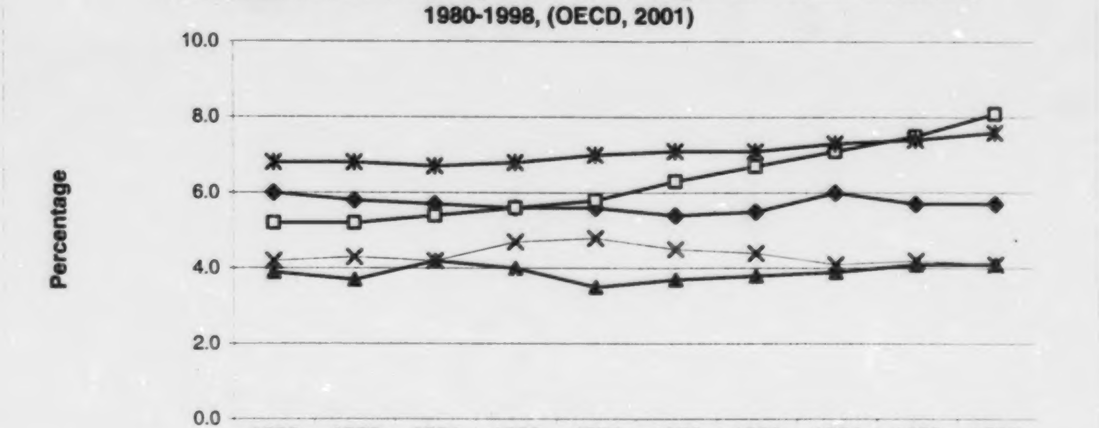
International Comparisons

International comparisons are based on OECD 2001 estimates.[ii]

With respect to the international standard among developed countries, where a low birth weight rate of less than 5.0 is considered as 'good', very few countries (of which Finland and Sweden are two) have consistently achieved this goal over an extended time period. Canadian rates dropped steadily since 1980 towards this aim, and although rising briefly again in 1992, have resumed a downward trend to rates nearer this 5.0% benchmark than many other OECD 23 countries, including the USA. Interestingly, the incidence of low birth weights in Japan actually increased over the same time period. The recorded rate in Japan in 1980 of 5.2% has risen steadily away from acceptable standards for developed countries to a high of 8.1% in 1998.

[ii] OECD 2001 estimates were used as they provide more recent and comprehensive information than those available from the World Health Statistical Annual Report on-line version. These estimates are predominantly more conservative than those presented by the United Nations Human Development Report. One other advantage of the OECD data is that it provides time series data for all countries that are similar to Canada in terms of standard of living (OECD 23). It should be noted, however, that differences in methodologies across countries and time do exist with regard to the inclusion or exclusion of very low birth weights. For this reason estimates presented here may differ from those reported by individual countries.

Figure 18 Low Birth Weight: International Comparison



	1980	1932	1984	1986	1988	1990	1992	1994	1996	1998
◆ Canada	6.0	5.8	5.7	5.6	5.6	5.4	5.5	6.0	5.7	5.7
□ Japan	5.2	5.2	5.4	5.6	5.8	6.3	6.7	7.1	7.5	8.1
▲ Finland	3.9	3.7	4.2	4.0	3.5	3.7	3.8	3.9	4.1	4.1
× Sweden	4.2	4.3	4.2	4.7	4.8	4.5	4.4	4.1	4.2	4.1
✳ USA	6.8	6.8	6.7	6.8	7.0	7.1	7.1	7.3	7.4	7.6

Source: Organization for Economic Cooperation and Development

(d) Infant mortality

Infant mortality refers to the death of a live born infant within the first year of life and is recognized as one of the most important measures of the health of a nation, its children and pregnant women. [See Appendix A]

The infant mortality rate is a long-established measure of infant health and the well-being of a society. It reflects not only the level of mortality, but also the health status and health care of a population. A high infant mortality rate in a population can be a reflection of deficiencies of physical and socio-economic factors such as nutrition, socio-economic status, education or health care. The infant mortality rate is also related to maternal factors such as education level, age, and smoking.

Factors outside of the health system influence infant mortality. This indicator is related to deficiencies in the physical and socio-economic environment, nutrition, education or health care of a population. Therefore infant mortality does not relate only to the performance of the health system. As a result, even in countries with low infant mortality rates over all, there are significant differences between socio-economic groups.[25]

Birth information allows one to compare infant deaths, which in turn facilitates understanding of the characteristics of infant deaths in Saskatchewan. Measuring death rates at the different stages (i.e. perinatal, neonatal, and post-neonatal) can provide useful information about timing and type of health care intervention for various populations.

For example, perinatal mortality (encompasses the combination of stillbirths and deaths within the first seven days following birth) has been used as an indicator of level of care or performance of the health system.[26] Mortality, however, tells us about fatal diseases (e.g. disorders related to short duration of pregnancy and low birth weight, respiratory distress syndrome, sudden infant death syndrome), yet provides no information about the number of sick babies or the extent of diseases that do not necessarily lead to death.[27,28] In fact, perinatal complications are the most important single cause of both infant mortality and perinatal death.[29]

Limitations

The infant mortality rate is primarily limited by the fact that its definition has changed over time and across provinces, territories and/or countries due to advances in medical technology. However, infant mortality rates can be a useful tool to measure the effectiveness of prenatal and postnatal programs over time and place, as well as a method of assessing achievement of population health objectives.[30]

In addition, differences in provincial registration systems can impact the comparability of the infant mortality rates, for example:

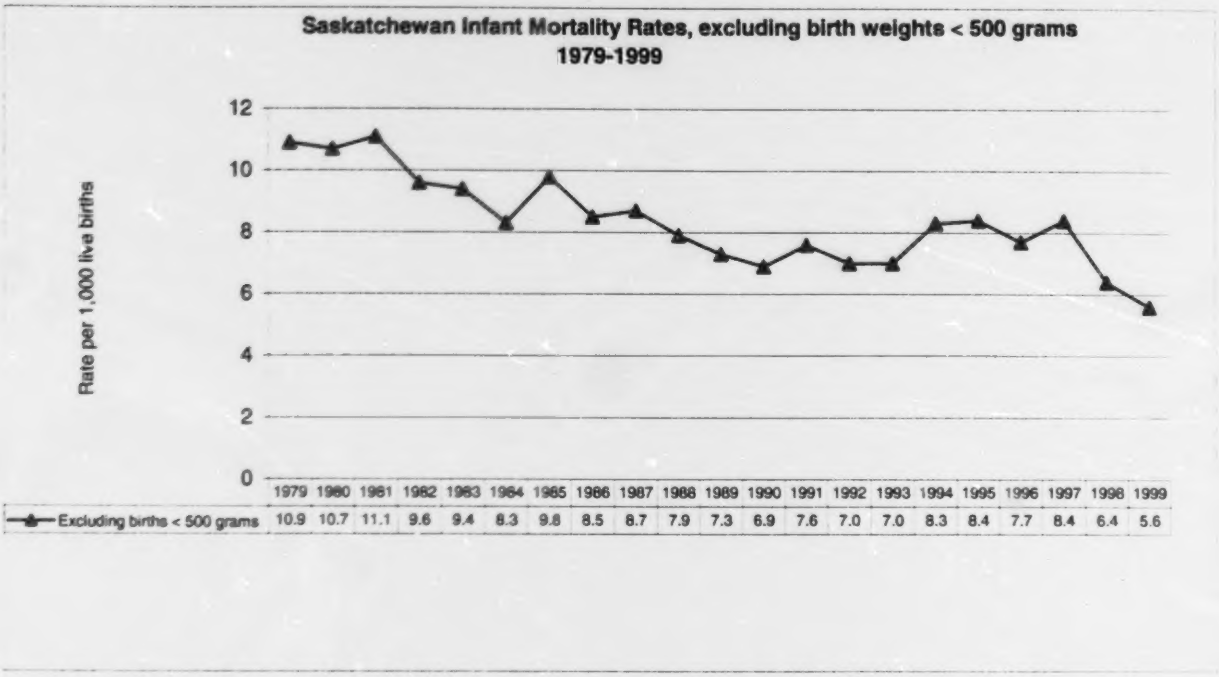
- the registration of live births of an extremely low birth weight (i.e. under 500 grams);
- differences in the classification of births as live births or still births;
- consistent reporting practises;
- timeliness, or time lags, in official registrations; and
- appropriate risk adjustment to account for differences in provincial populations (e.g. ethnicity, age, and sex).

Trend

In general, the infant mortality rate in Saskatchewan has been declining. However, a slight increasing trend was evident between 1992 and 1995.

Between 1982 and 1996, Saskatchewan experienced a fairly substantial decline in the infant mortality rate. However the largest reductions in rates were found prior to 1992. Since that time there has been some fluctuation in infant mortality rates, with small increases noted in 1994 and 1996. Studies have indicated that the infant mortality rates in most industrialised countries, including Canada, have decreased in the last century, but at a slower rate in recent years. This slower rate of decline in infant mortality rates may be a result of progress in perinatal care. Pregnancies that previously would have ended in miscarriage or stillbirth are resulting in low birth-weight births with precarious survival chances. Kramer and Joseph (1997) studied the increase in Canadian infant mortality in 1994 and suggested that the increase in the proportion of low birth weight newborns helped to explain the possible deterioration in maternal, fetal, or infant health.[31]

Figure 19 Infant Mortality Rate: Saskatchewan Trend, 1979-99



Source: Statistics Canada Catalogue 84F0210XPB, Births and Deaths and Statistics Canada website.

A recent examination of Saskatchewan infant mortality rates resulted in more specific observations for the six-year period from 1992 to 1997.[32] First, more infant deaths occurred among male infants (57%) while the majority of mothers experiencing an infant death were under 30 years of age at the time of birth (76%). Furthermore, over half (56%) of infant deaths that occurred to mothers under the age of 20 were reported in the Registered Indian population group.

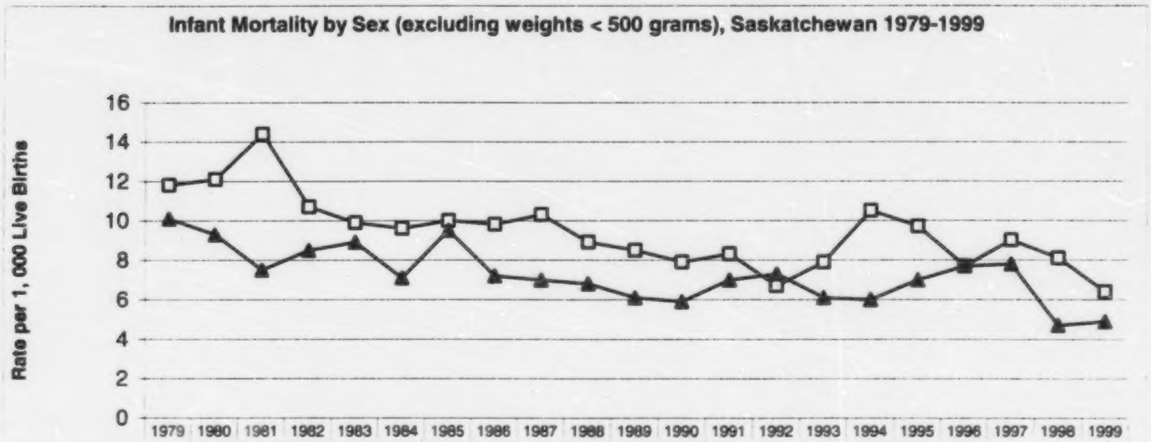
Second, over half (54%) of all infant deaths occurred among pre-term infants (infants born before the 37th week of gestation). However, Registered Indian infants were more likely to die at older ages than infants in the rest of the Saskatchewan population were.

Third, a regional analysis reveals a very different picture of infant mortality in Saskatchewan. As of 1996, Saskatchewan's average infant mortality rate (8.7) was above the national average (5.8). However, there were two service areas in Saskatchewan, Swift Current (5.2) and Melfort (3.9) where the infant mortality rates were below the national average.[33]

Sex

The number of infant deaths among males and females declined during the 20-year period, although there were fluctuations evident. The male infant mortality rate fluctuated from a high of 14.4 deaths per 1,000 live births in 1981, to a low of 6.4 deaths per 1,000 live births in 1999. The female infant mortality rate varied from a high of 10.1 deaths per 1,000 live births in 1979 to 4.7 deaths per 1,000 live births in 1998. With the exception of the 1992 and 1996 figures, higher infant mortality rates were recorded for males than for females in the 1979-1999 period. Between 1979 and 1999, the greatest difference between male and female infant mortality rate was in 1981, where the rate of male deaths (14.4 per 1,000 live births) was nearly twice the rate of female (7.5 per 1,000 live births) deaths.

Figure 20 Infant Mortality Rate, Saskatchewan Trend by Sex, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—□— Males	11.8	12.1	14.4	10.7	9.9	9.6	10.0	9.8	10.3	8.9	8.5	7.9	8.3	6.7	7.9	10.5	9.7	7.7	9.0	8.1	6.4
—▲— Females	10.1	9.3	7.5	8.5	8.9	7.1	9.5	7.2	7.0	6.8	6.1	5.9	7.0	7.3	6.1	6.0	7.0	7.7	7.8	4.7	4.9

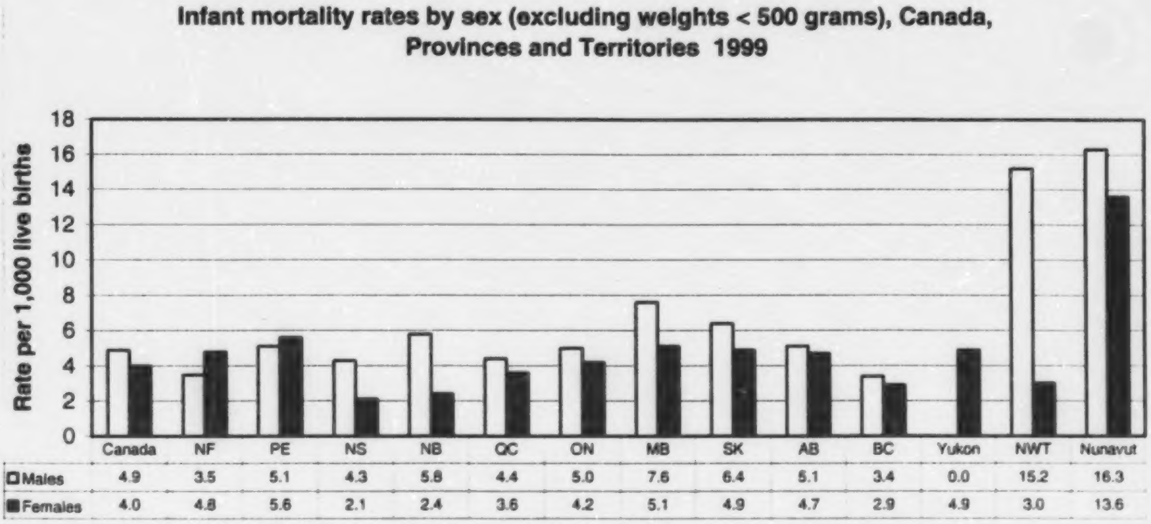
Source: Statistics Canada Catalogue 84F0210XPB, Births and Deaths and Statistics Canada website.

Provincial/Territorial Comparisons

Canada's infant mortality rate has declined dramatically in the last 35 years[34], as has the rate in Saskatchewan. In 1999, Saskatchewan had a male infant mortality rate of 6.4 deaths per 1,000 live births, a considerable decrease from 11.8 deaths per 1,000 in 1979. Similarly for females a decrease in the infant mortality rate was also recorded between 1979 (10.1 deaths per 1,000) and 1999 (4.9 deaths per 1,000).

With the exception of Newfoundland and Prince Edward Island, the infant mortality rate for males was higher than for females in all provinces in 1999. British Columbia had the lowest male infant mortality rate at 3.4 deaths per 1,000 live births, and Nova Scotia had the lowest female infant mortality rate (2.1 deaths per 1, 000 live births) for the same year. [Although numbers are available for the Northwest Territories, the Yukon and Nunavut, they should be viewed with caution due to the small sample size and should not be used in comparison to the other jurisdictions.]

Figure 21 Infant Mortality Rate: Provincial Comparison, 1999



Infant mortality rates by sex (excluding weights < 500 grams), Canada, Provinces and Territories 1999

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
☐ Males	4.9	3.5	5.1	4.3	5.8	4.4	5.0	7.6	6.4	5.1	3.4	0.0	15.2	16.3
■ Females	4.0	4.8	5.6	2.1	2.4	3.6	4.2	5.1	4.9	4.7	2.9	4.9	3.0	13.6

Source: Statistics Canada Catalogue 84F0210XPB, Births and Deaths and Statistics Canada website.

Differences in infant mortality rates are pronounced among the various socio-economic groups in Canada. In 1991, in Canada, the infant mortality rates of the high, upper-middle and middle income groups fell below the Canadian average, while the lower-middle and low income groups experienced higher than average infant mortality rates.[35] In 1994 the infant mortality rates were twice as high among First Nations people than the Canadian population as a whole, in spite of the dramatic reduction from 28 per 1000 live births in 1979 to 12 per 1,000 in 1994.[36]

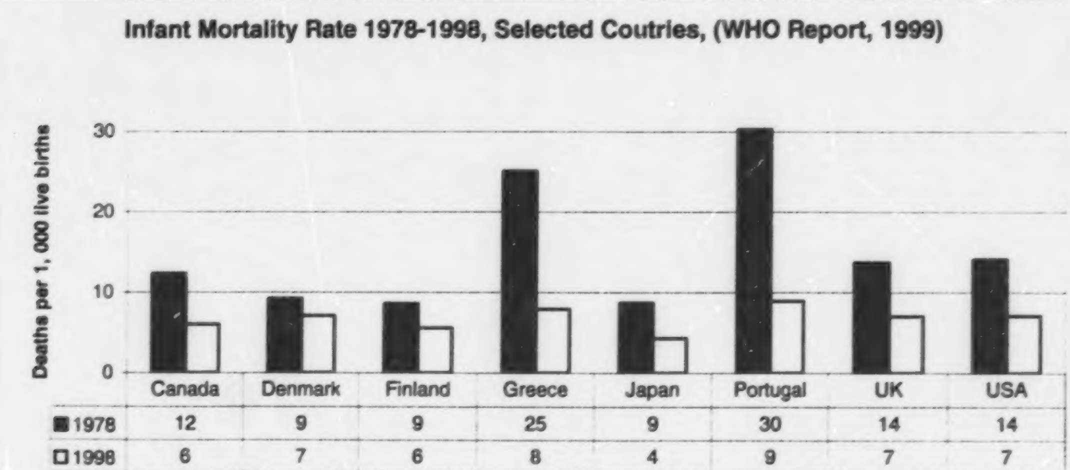
Similarly, in Saskatchewan, the infant mortality rates were significantly higher among the Registered Indian population than the non-Registered or the Saskatchewan population as a whole. In 1997, this difference increased substantially and future monitoring of these rates will determine if this widening gap becomes a trend.[37]

International Comparison

Definitions of infant mortality can vary from country to country, with respect to the inclusion or exclusion of very low birth weights, which can affect the comparability of estimates between countries. Despite this methodological caution, data from the World Health Report (WHO, 1999) provides comparison data on all countries that are similar to Canada in terms of standard of living, with recent estimates (1998) for all OECD countries. These estimates allow a comparison with 1978 data, but are generally speaking more conservative than OECD or other country-reported estimates.

Over a twenty-year time period Canadian rates of infant mortality dropped by 50%, indeed at a similar rate to several other countries in the OECD 23 (e.g. USA and UK). At a rate of 6 deaths for every 1, 000 live births in 1998 it is now approaching rates of infant mortality that are regarded internationally as being 'very good'. The largest reductions in infant death were recorded in Portugal, where infant mortality decreased from 30 deaths per every 1, 000 births in 1978 to 9 in 1998, and Greece which saw a decrease of 17 deaths per 1, 000 births over the same time period. Japan, Denmark and Finland (9 deaths /1, 000 births) all had relatively low rates of infant mortality in 1978 compared to other member countries, with Japan showing the largest decrement over time, and is in fact the only country, based on the WHO report data, to reach the infant mortality rate (4 deaths per 1,000 live births) regarded as being 'very good'.

Figure 22 Infant Mortality Rate: International Comparison



Infant Mortality Rate 1978-1998, Selected Coutries, (WHO Report, 1999)

	Canada	Denmark	Finland	Greece	Japan	Portugal	UK	USA
■ 1978	12	9	9	25	9	30	14	14
□ 1998	6	7	6	8	4	9	7	7

Source: World Health Organization Report, 1999

CHAPTER 2: **A STORY ABOUT PERSONAL HEALTH PRACTICES**

A broad range of personal health practices influences the health of Canadians.

Almost half the Canadian population aged 12 and older reported changing some aspect of their behaviour to improve their health in the year before the 1996-1997 National Population Health Survey. A slightly higher proportion of the population reported that some future change was needed. Women were more likely than their male counterparts to report changes in the past year, to recognize the need for change and to commit to making the change in the coming year.[38]

Personal health practices can include a wide range of behaviours and practices, however, for the purposes of this chapter we will focus on physical activity, body weight, youth smoking and exposure to environmental tobacco smoke. In addition, we will look at two specific sexually transmitted diseases, chlamydia and HIV and at unintentional injury and suicide rates.

2.1 Healthy Lifestyles

The type of personal health practices that we pursue influences how healthy we are as individuals and subsequently as a society. There is growing recognition that these personal life "choices" are greatly influenced by the socio-economic environment in which people live, learn, and work. Nevertheless, measuring and reporting on indicators associated with healthy lifestyles helps us to understand the overall health of a population and to design, change and implement health promotion programs.

For the purposes of this chapter we will look at personal health practices as they relate to physical activity, body weight, youth smoking and exposure to environmental tobacco smoke (ETS).

According to the National Population Health Survey, of the people recognizing the need for a lifestyle change prior to 1996-1997, most indicated that more exercise was the personal health practice that was needed. The two most significant barriers to making these lifestyle changes were identified as lack of time and will.

Lack of physical activity is recognized as a significant risk factor for heart disease and other serious health problems. Conversely, active living provides many health benefits including a reduced risk of cancer, diabetes, heart disease and osteoporosis, as well as an enhanced feeling of well-being.[39]

Smoking is another personal health practice that contributes to a range of health problems, including chronic lung disease, heart disease, stroke, and cancer of the lungs. In addition, smoking is associated with cancer of the cervix, pancreas and kidneys. The harmful effects of smoking do not end with the smoker, as second-hand smoke (also referred to as environmental tobacco smoke (ETS)) has harmful effects on non-smokers. Exposure to environmental tobacco smoke contributes to lung cancer, respiratory tract infections and heart disease.[40]

The smoking rates and rates of exposure to ETS in Saskatchewan are amongst the highest in the country. At the same time Saskatchewan has the highest rate of current smokers who quit between 1994 and 1998. According to the National Population Health Survey 21% of Saskatchewan respondents who were smokers in 1994/95 had quit by 1998/99.

Studies over time have shown that overall, smoking rates have dropped impressively among Canadians aged 15 and over since 1970. However, since 1990, there have been some fluctuations, with no clear trend developing. Unfortunately high rates of smoking still exist among three groups of people – youth, and women and men with lower income status.[41] For the purposes of this report the focus will be on youth smoking.

While body weight is not a personal health practice, it is, to a large extent, determined by eating and physical activity practices. Body weights above the healthy weight range are linked to numerous health problems, including cardiovascular disease, diabetes and some forms of cancer.[42]

(a) Physical activity

Non-communicable diseases (NCD's) have emerged in the last century as the leading cause of death and disability in developed countries. Although diseases such as cancer, cardiovascular disease, and diabetes, which are encompassed in the broad definition of NCD's, are multifactorial in origin, lack of physical activity is highlighted as one of several preventable risk factors.

As well as the unique contribution physical activity makes to health and well-being, it also interacts positively with strategies to modify other risk factors such as diet and tobacco use. This growing recognition amongst public health experts that sedentary behaviour is a serious public health burden is substantiated by scientific evidence that indicates that appropriate and regular physical activity provides demonstrable physical, social and psychological health benefits.

Being physically active on a regular basis also reduces the risk of premature death, and to some extent plays a role in preventing the development of disease. In some instances (i.e., developing heart disease, diabetes (Type 2), colon cancer, and lower back pain), the risk reduction is as high as 50%.[43] Benefits are noted for all age groups, but in particular, the elderly and aging, who comprise a large proportion of Saskatchewan's population, appear to experience increased functional capacity and independent living from the adoption of a physically active lifestyle.

Psychological well-being, with improved cognition, social interaction and integration is also enhanced with physical activity. This is especially important considering that there is an observable trend for participation in physical activity to decrease with age (only 32.3 % of Saskatchewan's population aged 65 or older are physically active compared to 66.4% of 12 to 19 year olds). Although a greater percentage of the younger segments of the population are involved in physical activity, there is a suggestion that many are not active enough for optimal growth and development.[44]

Increased participation in physical activity has also been associated with a reduced incidence of high-risk behaviours (such as smoking, alcohol, substance abuse, and inadequate dietary practices) in teenagers, and youth in general.

Health benefits occur at lower levels of intensity of physical activity than many people believe. Indeed, people who are usually inactive, such as those in the older age groups, can improve their health and well-being by becoming even moderately active on a regular basis. For the purposes of the report, moderately active is defined as energy expenditure between 1.5 to 2.9 kcal/kg/day. Recommendation is made that this is pursued for 30-60 minutes, 4 to 5 times a week.[45]

Over and above these significant health benefits for people of all ages, at the national level, there are considerable economic benefits associated with participation in physical activity in terms of reduced health care costs and increased productivity.

Given the numerous health benefits of physical activity, the problems posed by sedentary lifestyles become clear. Physical inactivity in this sense is a serious nationwide problem. With nearly half the population (49.1%) in Canada in 2000-01, and similarly at the local level, (Saskatchewan, 48.9%), recorded as being 'inactive', the problem of promoting fitness and wellness lifestyles becomes a public health challenge.

For the purposes of this report two aspects of physical activity will be focused on: The 'active' component (population aged 12 and over who report a physical activity index of "active") and the 'inactive' component (population aged 12 and over who report a physical activity index of "inactive") [See appendix A].

Limitations

There are a number of limitations associated with self-reported physical activity information. The most obvious limitation is that since individuals self-assess their levels of physical activity, each person's assessment may be different. In addition, some respondents may over-emphasize their level of physical activity to appear more active than they actually are.

The only way to collect data about physical activity is through surveys. However, some populations are systematically under-represented in surveys. For example northern residents may not be surveyed because of fewer telephones in the North or the inability of interviewers to access rural and remote populations. Data collection in the Yukon, the Northwest

Territories and Nunavut is more costly. For this reason, the territories are often not included in larger surveys, thereby making it more difficult to obtain data for the North (ACPH, 2001). In addition, current national health surveys do not collect information from certain populations, including individuals who reside on-reserve, have been institutionalised or incarcerated or are homeless (ACPH, 2001). There are also serious data gaps about some populations, for example, First Nations and Inuit (ACPH, 2001).

Trend

There has been a positive trend in recent years regarding the number of people in Saskatchewan aged 12 and over adopting some form of physical activity (39.3% in 1994-95 to 44.1% in 2000-01). The Canadian Fitness and Lifestyle Research Institute indicate that the most popular forms of activity for Saskatchewan residents in 1999 were walking (82%), followed by gardening and yard work (77%). Bicycling was also a popular pursuit, engaged in by 47% of adults living in the province.

The high percentage of people in Saskatchewan who report that walking is their most popular form of physical activity may be reflective of the fact that a good walking infrastructure is in place in the province. As reported by the Canadian Fitness & Lifestyle Institute in 1999, 69% of Saskatchewan residents state that there are many places in their communities where they can safely walk, with 44% who say that they frequently use these opportunities, with a further 24% stating they would walk more often if there were more safe places available. In terms of organized physical activities, cost and inconvenience are highlighted in this same report as common barriers people in Saskatchewan feel are in place to the pursuit of a more active lifestyle.

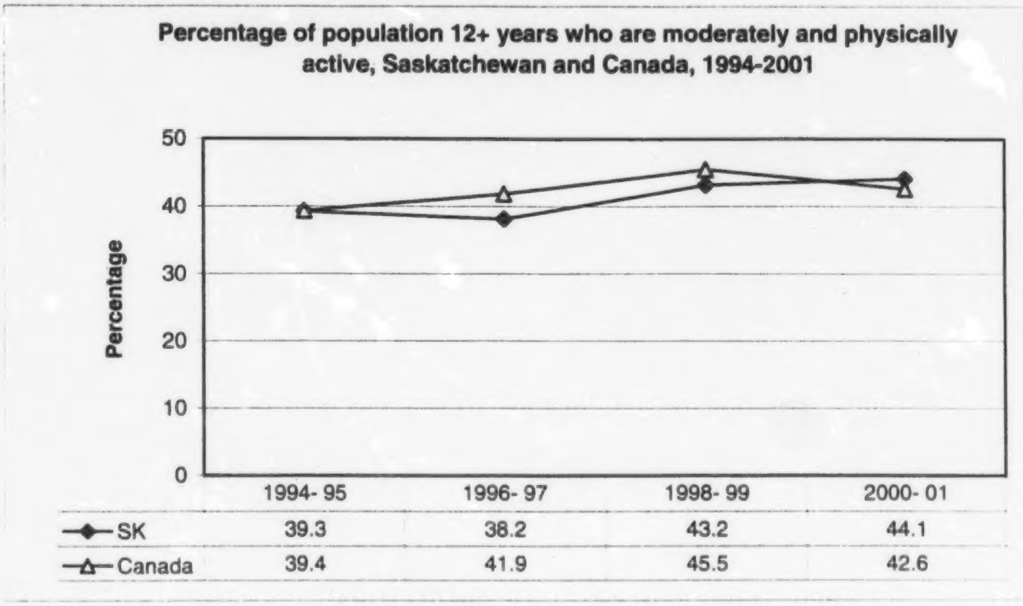
A significant proportion (34%) of Saskatchewan residents also felt that there was a lack of social support to encourage the adoption and maintenance of physically active lifestyles, many indicating that there was a lack of places where they can be active and bring their children along. Reducing costs and improving programs are all ways that Saskatchewan residents feel would help them achieve fitness goals. Overwhelming encouragement is noted for the building of a supportive infrastructure, in terms of well-maintained and well-linked networks of trails and paths, and the provision of supportive facilities such as showers, bicycle racks, and lockers at schools, workplaces, and community centres.[46]

a) Active

Between 1994 and 2001, there was an increase in the percentage of Saskatchewan's population aged 12 and over that was moderately or physically active during leisure-time. The percentage of the population reporting being active during leisure-time increased from 39.3% in 1994-1995 to 44.1% in 2000-01. The national pattern also displayed a similar trend.

In 1994-95, Saskatchewan's rate of those aged 12 and over who were moderately or physically active during leisure-time was the same as the national average of 39%. Indeed, Saskatchewan's percentage of individuals aged 12 years and older who were physically active during leisure-time remains comparable to the national average at each time point.

Figure 23 Physical Activity: Saskatchewan Trend, 1994-2001



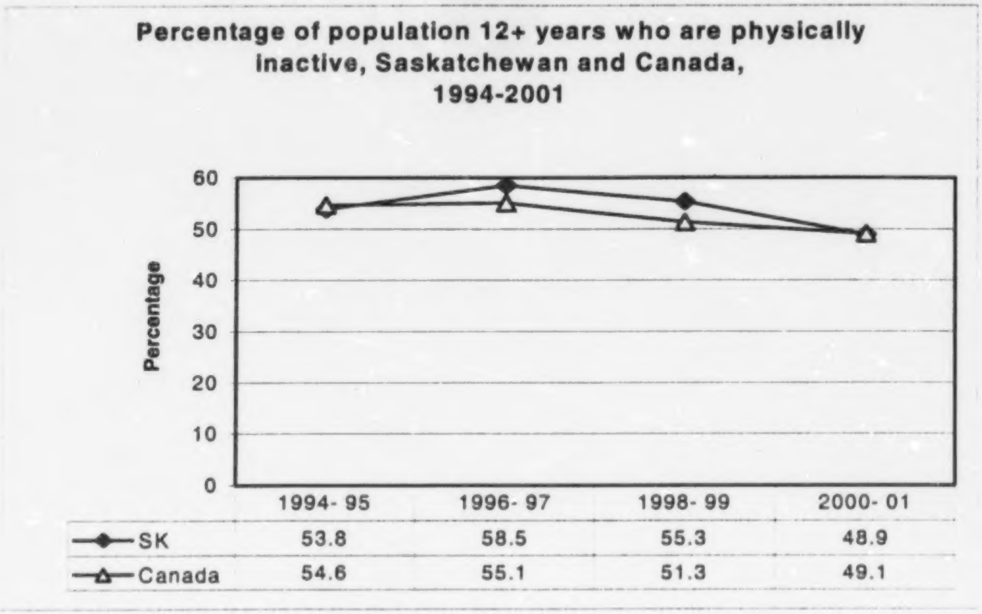
	1994- 95	1996- 97	1998- 99	2000- 01
SK	39.3	38.2	43.2	44.1
Canada	39.4	41.9	45.5	42.6

Source: Canadian Community Health Survey - Cycle 1.1 2000.

b) Inactive

Generally, there was a decline in the percentage of Saskatchewan population 12 years and older who were physically inactive during leisure-time during the 1994- 2001 period. In 1994-95, 53.8 % and in 2000-01, 48.9% of Saskatchewan's population aged 12 and over reported being physically inactive during leisure-time. Likewise, in Canada as a whole, 54.6 % of the population 12 years and older in 1994-95, and 49.1 % of the 2000-01 population aged 12 and over were physically inactive during leisure-time.

Figure 24 Physical Inactivity: Saskatchewan Trend, 1994-2001



	1994- 95	1996- 97	1998- 99	2000- 01
◆ SK	53.8	58.5	55.3	48.9
△ Canada	54.6	55.1	51.3	49.1

Source: Canadian Community Health Survey - Cycle 1.1 2000.

Sex and Age

a) Active

The percentage of individuals engaging in physical activity decreases with age. With reference to Saskatchewan's population in 2000-01, 66.4% of those aged 12 to 19 were physically active during leisure time compared with 32.3% of those aged 65 years and older. This trend holds true for both men and women.

In 2000-01, 69.5% of males 12 to 19 years were physically active during leisure-time compared with 63.0% of females. However, this pattern does not hold true in all age categories, for example, in the 35 to 44 and 45 to 64 age groups, the percentage of males physically active during leisure-time was slightly lower than for females in the same age categories. [See Appendix C – Figure V]

b) Inactive

There was a positive relationship between the rate of physical inactivity during leisure-time and age. For example, 23.6% of males and females aged 12 to 19 years old, compared to 61.2% of those 65 years and older, reported being physically inactive during leisure-time. Across all age groups, except for the 35 to 44 and 45 to 64 age categories, the percentage of females who reported being physically inactive during leisure-time was higher than males. [See Appendix C – Figure VI]

Provincial/Territorial Comparisons

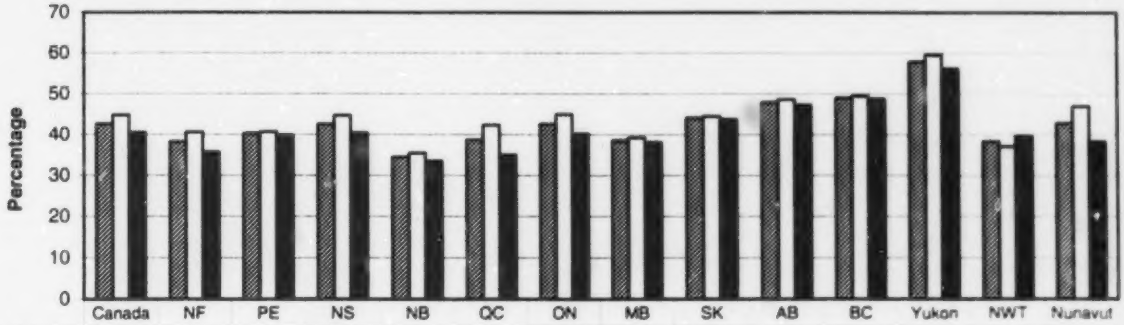
a) Active

Saskatchewan had the 4th highest percentage (44.1 %) aged 12 and over who reported being moderately or physically active during leisure-time in 2000-01. Only the Yukon (57.9%), British Columbia (49.0%), and Alberta (47.9%) had higher percentages of individuals who were physically active. The national average percentage (42.6%) of those 12 years and older who were physically active during leisure-time was below the Saskatchewan percentage.

The percentage of Saskatchewan males (44.5%) aged 12 and over who were moderately or physically active was similar to that reported from other provinces, and representative of the national average (44.8%). A similar pattern was evident for females aged 12 and over.

Figure 25 Physical Activity: Provincial Comparison, 2000-01

Percentage of population 12+ years who are moderately or physically active by sex, Canada, provinces and territories, 2000-01



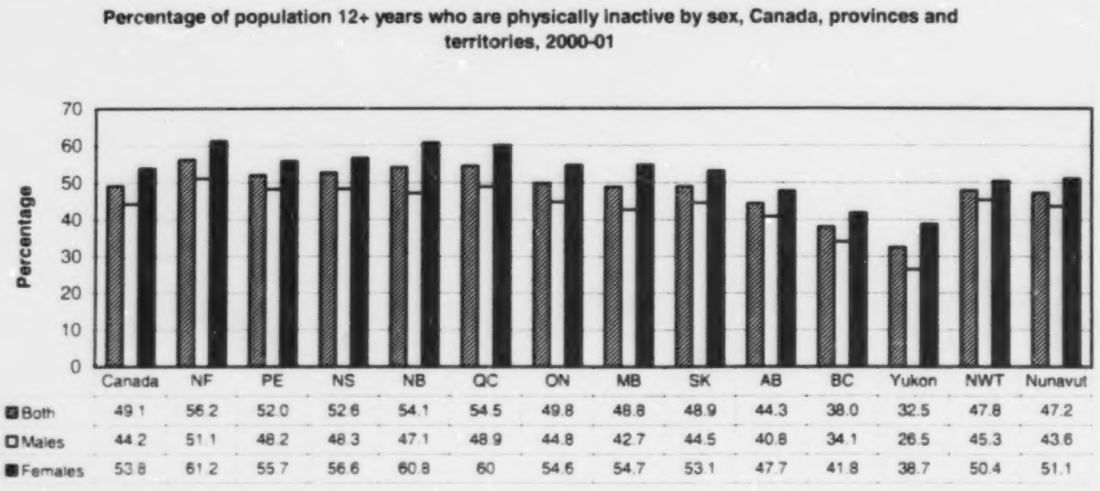
	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	42.6	38.2	40.3	42.5	34.5	38.7	42.6	38.6	44.1	47.9	49.0	57.9	38.4	42.9
☐ Males	44.8	40.6	40.7	44.7	35.5	42.3	45.0	39.3	44.5	48.6	49.4	59.5	37.1	47.0
■ Females	40.5	35.7	39.8	40.4	33.5	35.1	40.2	38.1	43.7	47.3	48.7	56.2	39.7	38.4

Source: Canadian Community Health Survey - Cycle 1.1 2000.

b) Inactive

Almost 49% of Saskatchewan people, over the age of 12 were physically inactive during leisure-time, slightly lower than the national average. About 45 % of Saskatchewan males and 44 % of Canadian males 12 years and older were physically inactive during leisure-time. A similar pattern was evident among females with 53.1 % of Saskatchewan females and 53.8 % of Canadian females aged 12 and over being physically inactive during leisure-time.

Figure 26 Physical Inactivity: Provincial Comparison, 2000-01



Percentage of population 12+ years who are physically inactive by sex, Canada, provinces and territories, 2000-01

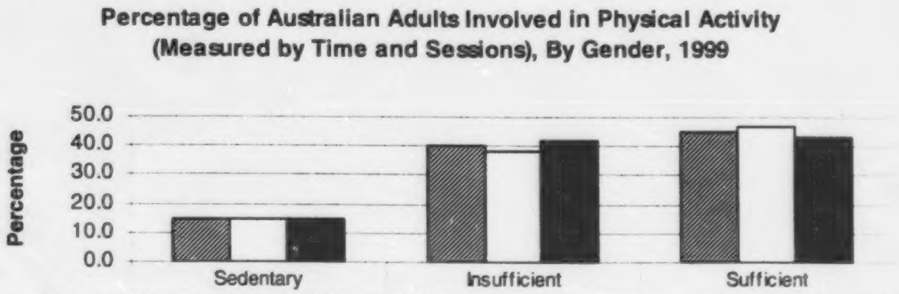
	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	49.1	56.2	52.0	52.6	54.1	54.5	49.8	48.8	48.9	44.3	38.0	32.5	47.8	47.2
☐ Males	44.2	51.1	48.2	48.3	47.1	48.9	44.8	42.7	44.5	40.8	34.1	26.5	45.3	43.6
■ Females	53.8	61.2	55.7	56.6	60.8	60	54.6	54.7	53.1	47.7	41.8	38.7	50.4	51.1

Source: Canadian Community Health Survey - Cycle 1.1 2000.

International Comparison

Two sources of comparison data were available as indices of physical activity status; The Australian Institute of Health and Welfare data, and the US Department of Health and Human Services estimates. Although both provide data on inactive and active populations by gender and age, the Australian data provides a measure of 'sufficient physical activity to achieve a health benefit'. This definition combines moderate and vigorous physical activity levels and, therefore, is most similar to the definition applied here with respect to Canadian estimates. Sufficient physical activity is an important concept in terms of the overall health benefits accrued from physical activity as measured by type of activity and intensity, and therefore, is chosen as the level at which a substantial number of health benefits might be observed.[47]

Figure 27 Physical Activity: International Comparison



	Sedentary	Insufficient	Sufficient
▨ Both	14.6	40.2	45.2
☐ Male	14.6	38.3	47.1
■ Female	14.7	41.9	43.4

Source: Australian Institute of Health and Welfare, 1999

The percentage of Australians engaging in 'sufficient' levels of physical activity is comparable to that reported above from Canadian samples. Overall, 45.2% of Australians reported engaging in a level of physical activity likely to result in substantial health benefits, as compared to the Canadian national average for both genders of 42.6%. Similarly, on the basis of gender, the reported rate of sufficient physical activity noted here for Australian males (47.1%) is comparable to that reported for physically active Canadian males (44.8%). Likewise, the estimates for the percentage of Australian women engaged in sufficient physical activity (43.4%) is not substantially different from that reported for Canadian females on a national basis (40.5%).

The distinction between 'inactive' and the Australian classification of 'sedentary' and 'insufficient levels of physical activity to produce a health benefit' precludes direct comparison to Canadian estimates of the level of inactive behaviour in the population. Similarities between levels defined as 'insufficient' in the Australian sample, and those recorded in Canada as 'inactive' can perhaps be noted however. For both males and females, the percentage of inactive individuals is not that dissimilar when consideration is given to the exclusion of individuals defined as sedentary. The percentage of Canadian males who report being inactive (44.2%) is analogous to that for Australian men of 38.3% (with the above proviso to interpretation in place). This is also true for estimates of female participation in physical activity. The Canadian average of 53.8% is somewhat similar to Australian samples considered as engaging in insufficient levels of physical activity to produce substantial health benefits (41.9%), again respecting the differences in definition of behaviour noted here.

(b) Youth Smoking

Tobacco use is the leading cause of preventable illness and death in Canada. Health Canada estimates that smoking is responsible for more than 45,000 deaths per year. Because of the addictive nature of nicotine, youth smoking is of particular concern. It is estimated that approximately eight out of every 10 people who try smoking become habitual smokers, thereby highlighting the importance of preventing the uptake of smoking. This indicator measures the proportion of youth between the 12 to 19 years of age who smoke on an occasional or daily basis, otherwise known as current smokers.[iii]

In 2000/01, youth smokers made up 12% of the total smokers in Canada. Similarly, young smokers made up 14% the total smoker population in Saskatchewan. (Statistics Canada, Health Indicators Website).

According to the 2000 *Canadian Tobacco Use Monitoring Survey (CTUMS)*, Canadian smoking prevalence rates have reached the lowest overall level recorded since regular monitoring began in 1965. Since 1965, when 50% of Canadians 15 years of age and older smoked, the rate has declined and was estimated to be 24% in 2000.[48] While the overall smoking rates have been declining steadily over the past 35 years, the rates for youth aged 15 to 19 years of age have not shown the same pattern.[49]

According to the *Statistical Report on the Health of Canadians*, there are some important ways in which teen smoking is distinctive from that of the general population (ACPH, 1999a). Most significantly, the teen rate of current smokers increased substantially between 1990 (21%) and 1994 (29%), unlike that of other groups in the population. This level has remained at 29% into 1996/97. Youth between the ages of 12 to 17 are also the only age group in which females are more likely than males to smoke. The prevalence of smoking among young females is most pronounced between ages 15 to 17 but occurs as young as age 12 to 14: 10% of girls at that age were current smokers, compared with 6% of boys.

According to the Centres for Disease Control and Prevention (CDC) in the United States, smoking among young people produces both short and long-term health effects.[50] The short-term health effects include damage to the respiratory system, addiction to nicotine and the associated risk of other drug use. The long-term health consequences are exacerbated by the fact that most young people who smoke regularly, continue to smoke throughout adulthood.

Smoking hurts young people's physical fitness in terms of performance and endurance, even among those trained in competitive sport. It can hamper the rate of lung growth and the level of maximum lung function. The resting heart rates of young adult smokers are 2-3 beats per minute faster than those of non-smokers.[51] Regular smoking is responsible for cough and increased frequency and severity of respiratory illnesses.[52] [53] High school seniors who are regular smokers and began smoking by grade nine are found to be 2.4 times more likely than their non-smoking peers to report poor overall health; and 2.4 to 2.7 times more likely to report cough with phlegm or blood, wheezing or gasping, and finally, shortness of breath when not exercising.[54]

[iii] Although recommendation is made to analyse Daily and Occasional youth smokers separately, data from Saskatchewan are currently unavailable as estimates for 1994 through to 1998 are either too unreliable to be published (Occasional Smokers), or are only available with advice to use caution in interpretation (Daily Smokers).

Smoking is also associated with other at risk behaviours. For example, the CDC (1994) found that teens who smoke were three times more likely than non-smokers to use alcohol, eight times more likely to use marijuana, and 22 times more likely to use cocaine. The CDC also found smoking to be associated with behaviours such as fighting and engaging in unprotected sex.

Smoking has also been associated with mental health problems. For example, high school seniors who were regular smokers and began smoking by grade nine were 3 times more likely to have seen a doctor or other health professional for an emotional or psychological complaint.[55] This does not mean, however, that the smoking was the cause of the mental health problems, but rather may be a means of coping with mental health difficulties.

Limitations

Tobacco use is generally measured in three ways: prevalence, consumption and tobacco sales. Each of these measures has strengths and weaknesses, yet used together can complement each other. One of the most common and economical methods of data collection for prevalence is the telephone survey. However, because of the fewer number of households with telephones in the North, data collection in the Yukon, the Northwest Territories and Nunavut is more costly and less complete. The territories are typically not included in larger surveys, thereby making it more difficult to obtain data for the North.[56]

In addition, current surveys do not collect information from certain populations, including individuals who reside on-reserve, have been institutionalized or incarcerated or are homeless. There are also serious data gaps for some populations, for example, First Nations and Inuit populations.[57]

Another method of data collection uses tobacco consumption rates, which sometimes rely on self-reporting. Smokers inevitably under-report their consumption,[58] [59] and there is some suggestion that respondents may partially modify their perceptions to reflect greater social desirability, or simply may be unable to accurately determine the regularity of their smoking habit.[60] However, since under-reporting is consistent for both women and men, and among all age groups, year-to-year comparisons can be made with a degree of confidence.[61]

Greater insight is needed into what motivates young people to start smoking and what deters them from taking up smoking. This target group requires a tailored health promotion approach to suit their needs, lifestyle and stages of life. While adults have difficulty acknowledging the reality of the adverse health consequences of smoking when their onset is often delayed by decades, it is much more difficult for teenagers to visualise their lives even five years from the present let alone visualize the long-term consequences of smoking.[62]

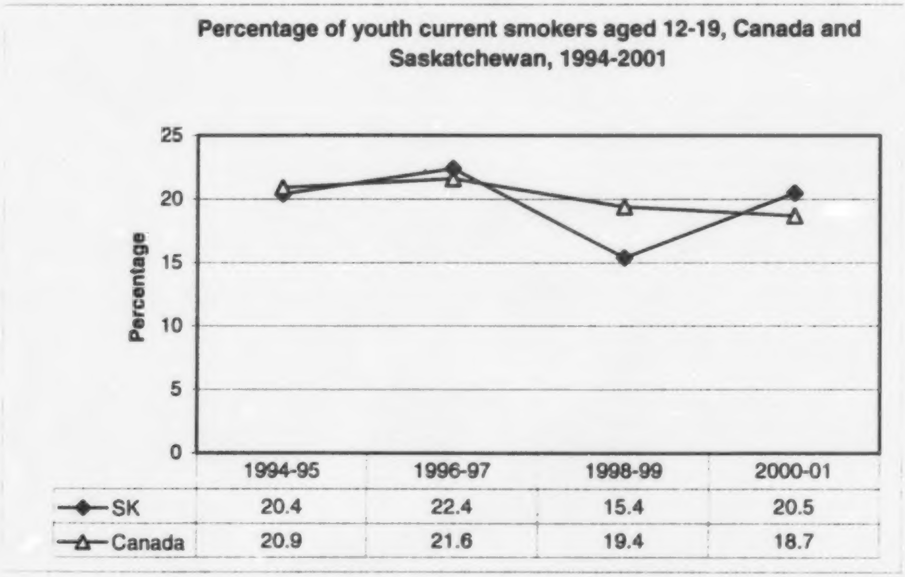
Currently most of the data on youth smoking is reported for two age groups: 15 to 19 year olds and 20 to 24 year olds. However, it is known that children between the ages of 10 to 12 years also take up smoking. More information is needed on the circumstances and motivation of very young smokers.[63]

This indicator allows the identification of groups at risk according to various characteristics, such as: sex, age, marital status, index of stressful events, and socio-economic status. It also allows for comparisons over time and place. It helps to set health objectives and assessing achievement towards these objectives and can be useful in planning preventive and promotional interventions.[64] In order to successfully intervene in this area, one must understand which young people are likely to initiate smoking and at which ages. In addition, one would need to know which young people appear most resistant to tobacco use and how and why adolescents move through the different stages of smoking behaviours, and successful interventions thus far.[65] This indicator may be limited in its ability to reveal the answers to the bulk of these questions.

Trend

Within Saskatchewan there were fluctuations in the rate of teen current smokers [iv] between 1994-95 and 2000-01, however the rate in 2000-01 is similar to 1994-1995.

Figure 28 Youth Smoking: Saskatchewan, 1994-2001



Source: Canadian Community Health Survey

Note: Saskatchewan estimates for 1994-95, 1996-97, & 1998-99 should be interpreted with caution

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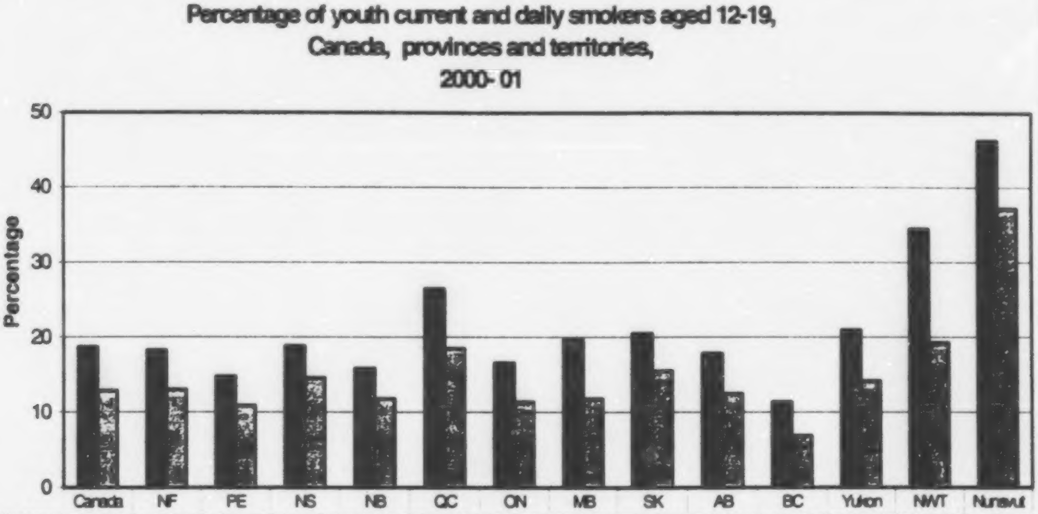
[iv] Current smokers are those who smoke on either a daily or an occasional basis.

Provincial/Territorial Comparisons

In 2000-01, Saskatchewan's rate of current youth smokers was 20.5%, with British Columbia having the lowest rate of current youth smokers at 11.4%. Similarly, Saskatchewan's rate of youth daily smokers was 15.5% with British Columbia again having the lowest rate of youth daily smokers at 6.9%. Saskatchewan's rates for both youth current and daily smokers were 18.7 per and 12.9 per cent, respectively. Provincial differences in consumption may be partially due to cigarette price differences, as well as tobacco control initiatives.[66]

Figure 29 Youth Smoking: Provincial Comparison, 2000-01



Percentage of youth current and daily smokers aged 12-19, Canada, provinces and territories, 2000- 01

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
Current smokers	18.7	18.3	14.8	18.9	15.9	26.5	16.6	19.7	20.5	17.9	11.4	21	34.5	46.3
Daily smokers	12.9	13	10.9	14.6	11.8	18.5	11.4	11.8	15.5	12.5	6.9	14.2	19.3	37.2

Source: Canadian Community Health Survey

Note: Date from the Yukon should be interpreted with caution. Estimates for Prince Edward Island daily smokers should also be interpreted with caution.

Adolescent smoking behaviour is a dynamic process that changes over time. For most adolescents, attitudes towards smoking change at different ages, and decisions to smoke or not smoke are made at multiple times during adolescence. For most youth, there is no one point where a primary decision regarding tobacco use is irrevocably made.[67] While research has provided greater insight into the reasons young people take up smoking, understanding of the causes of the progression through the other stages of smoking behaviours is far less developed. Some of the initiatives for prevention and cessation of youth smoking have included:

- **Youth with Special Needs**

In its report on *Children and Youth with Special Needs* (2001) [68], the Canadian Council on Social Development (CCSD) analyzed the data from the National Longitudinal Survey of Children and Youth and found that children and adolescents with chronic conditions reported higher rates of tobacco use: 34% of adolescents with a chronic illness had smoked cigarettes either occasionally or regularly in the previous month, compared with 21% of teens without a chronic health problem. Children aged 10 and 11 with special needs were also more likely to have tried smoking: 13.9% versus 9.7% respectively. The significance again is highlighted by the 80% chance of becoming a habitual smoker once starting. The younger people start smoking cigarettes, the more likely they are to become strongly addicted to nicotine.[69]

- **Female Youth**

On another front, the CCSD's *Personal Security Index 2000* points out that cancer is one of the leading causes of premature deaths in Canada.[v] Of particular concern is the increase in the incidence of lung cancer. Teenaged girls are now more likely to smoke than adolescent boys, and if the increased rates of smoking among young women are not reversed, lung cancer rates among women will continue to climb. The Federal/ Provincial/ Territorial Advisory Committee on Population Health reinforced this same finding in its report, *The Opportunity of Adolescence: The Health Sector Contribution* (2000).

While there has generally been less interest in the root causes of teen smoking and more emphasis on how-to-quit strategies, groups in Canada have been studying the factors that influence smoking in young women.[70] This research indicates that peer pressure may not contribute to uptake and maintenance of smoking but rather young women use it to help them cope with stress in their lives.[71] This stress may be the result of such things as: emotions resulting from past or present abuse, coping with the pressures of living in a "man's world," pressures to maintain a good shape and body weight, and poverty. While peer pressure contributes to initial experimentation, it does not necessarily lead to regular use.[72]

Another study on youth smoking in Saskatchewan postulates that adolescent females may smoke more than males in part, because of the success of modern advertising campaigns directed at young females to pressure them to smoke. This study also found that the youth in the northern communities smoke more than those in the central and southern areas of the province.[73]

- **Aboriginal Population**

Little data exists on tobacco use by Aboriginal peoples. However, we do know that the age of onset for tobacco use is substantially younger among Aboriginal children in some communities[74], and that the use of smokeless tobacco by Aboriginal youth in the Northwest Territories and northern Saskatchewan also poses a significant health problem.[75]

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[v] PYLL - how many years the person might have lived had they not died prematurely before the age of 75, the average of life expectancy for men.

- **Poverty and Income Inequality**

Poverty has been found to influence the likelihood of engaging in risky health behaviours.[76] The highest rates of substance use are among low-income and homeless youth.[77] Poor children are much more likely to smoke and consume drugs or alcohol.[78,79]

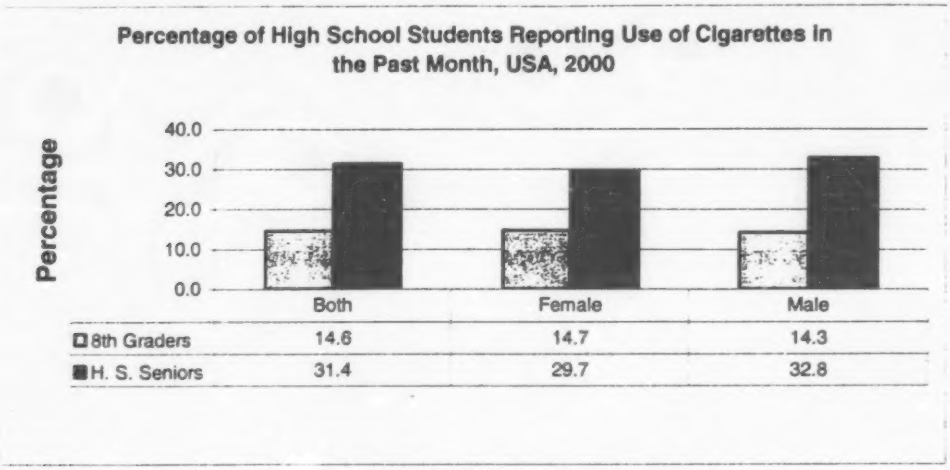
This same study shows that poverty and income inequality affect health through many pathways. Poverty, or absolute material deprivation, often comes with dangerous or stressful employment; poor nutrition; substandard housing; living in unsafe, polluted neighbourhoods; adoption of unhealthy behaviours (e.g. smoking), and lack of access to benefits and services. Income inequality, or relative material deprivation compared with the rest of the population, is often associated with diminished life expectations or lack of hope; knowledge or awareness of one's marginality; lack of personal control or uncertainty associated with social status; and decreased social cohesion or greater social disintegration.[80]

There is growing consensus in Canada, and world-wide, that economic inequality impacts health.[81] The larger the gap that exists between rich and poor is (i.e., the more unequal the distribution of income) the greater the gap in health outcomes. Consequently, the more equitable and inclusive societies tend to be healthier societies, thereby highlighting the interconnected nature of social, economic, and physical well-being.

International Comparison

Supplementary data from the US National Institute on Drug Abuse is reported here as it provides a breakdown of tobacco experimentation in youths (8th grade and high school seniors) Although the data presented here is only from one other country, other international comparison data sets compounds youth with adult current smoking practices. Data available from the United States provides a better indication of Canada's comparability to other countries with respect to adolescents' experience with smoking.

Figure 30 Youth Smoking: International Comparison



Percentage of High School Students Reporting Use of Cigarettes in the Past Month, USA, 2000

	Both	Female	Male
□ 8th Graders	14.6	14.7	14.3
■ H. S. Seniors	31.4	29.7	32.8

Source: US National Institute on Drug Abuse, 2000

Data from the US National Institute on Drug Abuse indicate that the percentage of teenagers who are current smokers is somewhat similar to that found in Canada (18.7% of current smokers aged 12 –19 years being reported in 2000-01 as the national average for Canada). Averaging over the grade 8 and high-school senior categories (23%) recorded for the US data, it can be seen that Canadian rates of teenage smoking are not dissimilar to that found in other countries that share characteristics with Canada in terms of standard of living. The effects of age are also apparent in this data, older respondents (high school seniors) being more likely to be current smokers than 8th grade students. Differences between males and females also appear to be minimal in these age groups (especially at the grade 8 level). Male high school seniors (32.8%) represent slightly more of the current smokers in this age group than females (29.7%). Canadian national data for males and females indicates very little evidence of a gender difference for individuals aged 12-19 years (females 19.8%, males 17.6%).

(c) Exposure to environmental tobacco smoke

The relationship between environmental tobacco smoke and adverse health effects is well accepted. Besides being a known mucous membrane irritant, second-hand smoke exposure is linked to increases in mortality from lung cancer and cardiovascular disease. Second-hand smoke also has serious consequences for children. Smoking mothers bear children with lower birth weights, and children living in homes where they are exposed to tobacco smoke have higher rates of asthma and respiratory tract problems. There is strong evidence of an association between exposure to environmental tobacco smoke and respiratory problems.

The environmental tobacco smoke (ETS) indicator is intended to reflect the effectiveness of the public health system in protecting non-smokers against exposure to tobacco smoke in public spaces and work places. We know that ETS represents a serious health risk for

Canadians. Health Canada has estimated that more than 300 non-smoking Canadians die each year from lung cancer as a result of ETS and several thousand non-smokers die each year from ETS related heart disease. While one can argue about the attribution of a certain number of deaths to ETS, we cannot argue that it is not a significant health issue.

The Second Report on the Health of Canadians stated that pregnant women, foetuses and young children are particularly susceptible to the effects of ETS. These effects include low birth weight, increased risk of sudden infant death syndrome, reduced lung development and increased severity of respiratory illnesses.

The Second Report estimated that in 1995 at least 1.4 million Canadian children were exposed to ETS in their homes. The General Social Survey estimated that about one third of daily smokers in Saskatchewan exposed at least one child to ETS in 1995.

Health Canada estimated that the proportion of the population covered by municipal smoking restrictions in 1995 ranged from 3% in Newfoundland to 81% in Ontario. In Saskatchewan about 55% of the population was covered by such bylaws in 1995 (up 5% from 1991). Admittedly the existence of bylaws does not speak to the effectiveness of the protection of the population, however, they are statements of municipal principle and concern.

For the purposes of this report we are looking specifically at the proportion of the non-smoking Canadian population regularly exposed to environmental smoke in public spaces and work places.

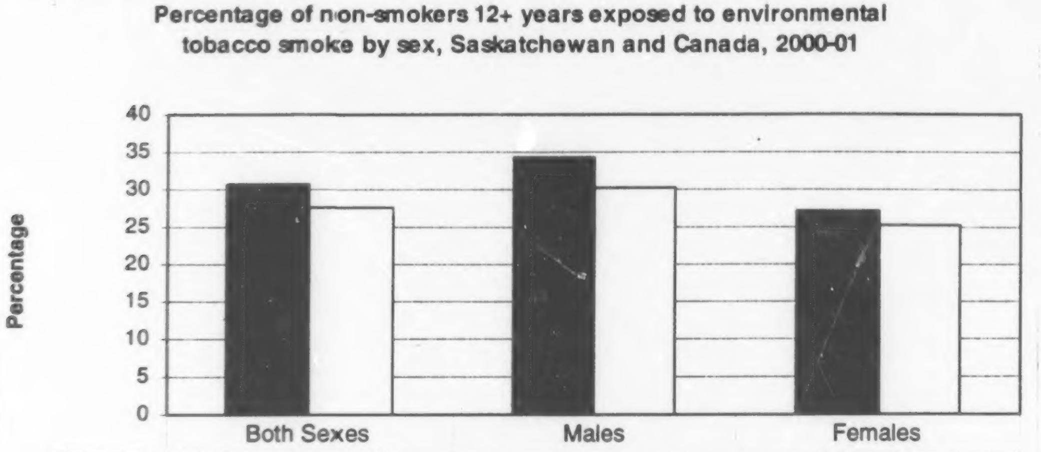
Limitations

This measure has similar limitations as the youth smoking measure above.

Sex and Age

Nearly one-third (30.7 per cent) of Saskatchewan non-smokers 12 years and older were exposed to environmental tobacco smoke (ETS) on most days in the month prior to the survey. The percentage of Saskatchewan non-smokers exposed to second-hand smoke was higher than the national average (27.6 per cent). The rate of exposure to environmental tobacco smoke on most days in the month preceding the survey was higher for males than females. About one-third (34.3 per cent) of the non-smoking males aged 12 and over were exposed to second-hand smoke compared to 27.2 per cent of females. A similar trend was shown at the national level.

Figure 31 Environmental Tobacco Smoke: Saskatchewan, 2001



Percentage of non-smokers 12+ years exposed to environmental tobacco smoke by sex, Saskatchewan and Canada, 2000-01

	Both Sexes	Males	Females
■ SK	30.7	34.3	27.2
☐ Canada	27.6	30.2	25.3

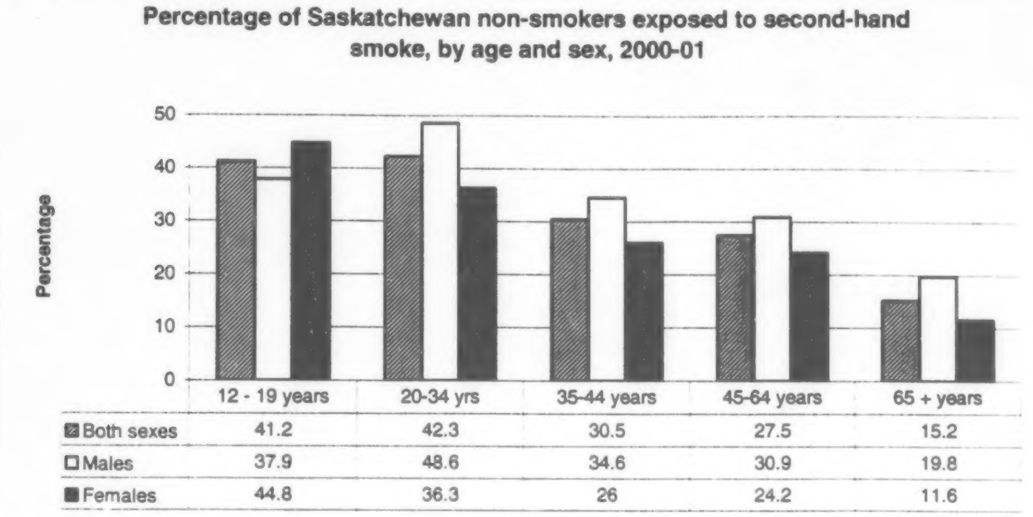
Source: Canadian Community Health Survey

Young non-smokers in Saskatchewan are more likely to be exposed to second-hand smoke than older adults. About 41 per cent of teenage non-smokers, and 42 per cent of those in the 20 to 34 years age group of both genders, were exposed to second-hand smoke. The exposure to second-hand smoke of older adults (especially from age 35 upwards), and the rates of smoking in adults of a similar age parallel each other - 29 per cent of adults between the ages of 45-64 are current smokers[vi], while 28 per cent of non-smokers within this same age category are exposed to environmental tobacco smoke. However, non-smoking teenagers between the ages of 12 to 19, regardless of gender, had much higher rates of contact with second-hand smoke (41 per cent) than the 21 per cent of smokers in the same age category. It would seem that teenaged non-smokers are not only exposed to environmental tobacco smoke by their peer group, but also by their parents. In fact, the home is the most common source of second-hand smoke for non-smoking teenagers.[82]

Generally, amongst the total population of non-smokers aged 12 and over, males have more exposure to environmental tobacco smoke than female non-smokers. However, the picture looks different when comparing the rates of exposure of non-smokers to environmental tobacco smoke by sex and age categories. For example, 44.8 per cent of female non-smokers 12 to 19 years old were exposed to environmental tobacco smoke compared with 37.9 per cent of their male counterparts. These percentages change, with males consistently being exposed to more tobacco smoke than females in every other age category.

[vi] Current smokers are those who smoke on either a daily or an occasional basis.

Figure 32 Environmental Tobacco Smoke: Saskatchewan Data by Age & Sex, 2000-01



Percentage of Saskatchewan non-smokers exposed to second-hand smoke, by age and sex, 2000-01

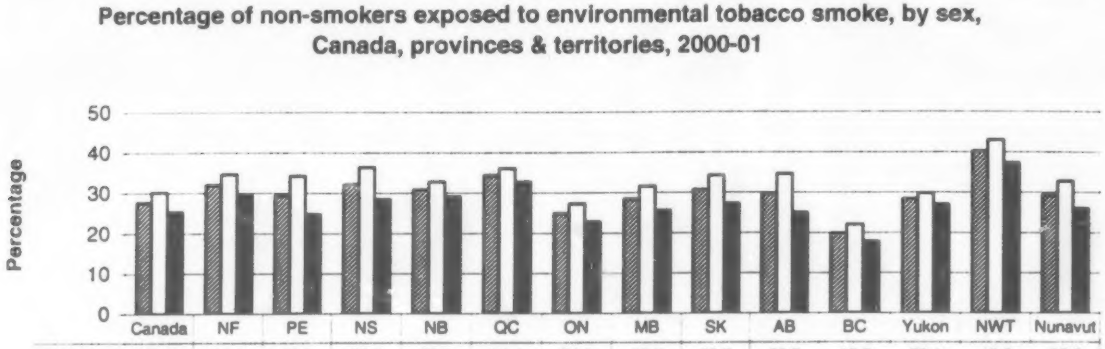
	12 - 19 years	20-34 yrs	35-44 years	45-64 years	65 + years
▨ Both sexes	41.2	42.3	30.5	27.5	15.2
☐ Males	37.9	48.6	34.6	30.9	19.8
■ Females	44.8	36.3	26	24.2	11.6

Source: Canadian Community Health Survey

Provincial/territorial comparisons

In 2000-01, 30.7 per cent of Saskatchewan non-smokers of both genders, aged 12 years and older, were exposed to environmental tobacco smoke. British Columbia had the lowest percentage (19.8 per cent) of non-smokers exposed to environmental tobacco smoke. The national average is 27.6 per cent. In all provinces and territories more male non-smokers were exposed to environmental tobacco smoke than females.

Figure 33 Environmental Tobacco Smoke: Provincial Comparison, 2000-01



Percentage of non-smokers exposed to environmental tobacco smoke, by sex, Canada, provinces & territories, 2000-01

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	27.6	32.0	29.3	32.2	30.9	34.4	24.9	28.5	30.7	29.7	19.8	28.4	40.2	29.3
☐ Males	30.2	34.6	34.3	36.4	32.8	36.1	27.3	31.6	34.3	34.6	22.0	29.8	43.0	32.8
■ Females	25.3	29.5	24.8	28.5	29.1	32.7	22.8	25.6	27.2	25.0	17.8	27	37.3	26.0

Source: Canadian Community Health Survey

International Comparisons

Currently there is no internationally comparable information available regarding the exposure to environmental tobacco smoke.

(d) Body weight

There are serious health risks associated with being underweight and overweight. However, for the purposes of this report we will focus on the very serious health effects of being overweight or obese, using the body mass index (BMI) to determine if an individual's weight is in a healthy range. [See Appendix A] This is not meant to minimise some of the important health effects of being underweight. For example, eating disorders represent a large and growing problem particularly among women. As many as 15% of young women have substantially disordered eating attitudes and behaviours and up to 300,000 Canadian women aged 13 to 40 years suffer from anorexia nervosa.[83]

Numerous psychosocial and medical conditions are associated with obesity in adults, including cardiovascular risk factors such as hypertension and hyperlipidemia, type 2 diabetes, respiratory problems, arthritis, certain types of cancer and pregnancy complications. Obesity in children, which may persist into adulthood, is associated with psychosocial and medical consequences such as hyperlipidemia and abnormal glucose metabolism. Obesity is also a risk factor for joint disease, gallstones and respiratory problems [84].

The Second Report on the Health of Canadians suggests that dietary changes and decreases in physical activity are two major reasons for the increasing prevalence of excess body weight in Canada and internationally. Diet and physical activity are undeniably important contributors to unhealthy weights. Nevertheless, to guard against blaming the victim entirely, there are other important factors which influence the development of unhealthy weights – availability and cost of healthy foods, culture, biological susceptibility.

Because the environmental problems leading to obesity, and the policy and environmental approaches to solve the problem lie largely outside the health sector, multisectoral understanding and collaboration are required for population-wide obesity control. Problematic trends influencing options for eating include increases in the amount of available food, especially convenience food; portion sizes; the availability and consumption of soft drinks and fruit juices; the volume of television food advertising and food consumption outside the home. Societal trends influencing opportunities for physical activity include habitual use of cars, urban design features such as lack of sidewalks, homes with remote controlled televisions, proliferation of television channels, labour saving devices, home computer use. Fewer children walk to school due to distance or safety, school physical activity programs have declined. Other trends include increased mechanization, uninviting stairwells, reduction in family meals, and the lag between the nutrition advice about nutritional adequacy to the emphasis on moderation.

The prevention of obesity and concomitant health consequences involves the promotion of healthy behaviours, especially a balanced diet and physical activity. Equally important is establishing an environment conducive to healthy behaviours and to behaviour change. It is one thing to promote physical fitness; it is another to make fitness facilities available and affordable. Similarly the promotion of a healthy diet is important, however, the availability, cost and culture around food and its preparation are also critical.

Recognizing the serious nature of obesity in Saskatchewan, the province has adopted several strategies aimed at promoting healthy behaviours especially around diet. Primarily, much of this work has fallen within the domain of public health nutritionists, and other health, physical activity, and education professionals. These individuals have been, and continue to be active in a number of areas including working towards healthier school meal programs, physical activity policies, increased availability of more nutritious food in more remote or low income areas, healthy body weight programs for schools, and food security initiatives that include community kitchens and community gardens.

Secondary to this primary prevention approach is a model of health care delivery that has also been adopted in the province. This collaborative approach to treatment involves physicians, primary care nurses (nurses working in an expanded role), nurses, and other health professionals and ultimately may also include other human service sectors such as Education, Social Services, Justice, and the Municipal government. Primary care teams focus on the development of:

- a proactive approach to reaching high risk populations prior to experiencing health problems;

- screening and monitoring programs to support early detection and intervention to address health problems; and
- outreach programs, which may involve partnerships with community groups and community based organizations as well as public health, mental health, addictions and other health services.

Saskatchewan has also adopted a Provincial Plan for the Control of Diabetes, which uses a team approach to diabetes management and the provision of diabetes education, care and treatment, which recognizes that the person with diabetes is responsible for self-management of the disease. Saskatchewan Health has committed additional funds to enhance professional training and continuing education, and to improve access to education, care and treatment for persons with diabetes.

Diabetes prevention, care and treatment initiatives are being developed to meet the needs of both First Nations and non-First Nations people recognizing that required services must be culturally sensitive and locally accessible to the extent possible.

In addition, seven population health promotion demonstration sites for the primary prevention of type 2 diabetes were established in January 1999, and continued till March 2002. Five of those sites have received funding for 2002-03 as well. This initiative focuses on primary prevention and health promotion in the population as a whole – including those in specific high-risk groups and those who are at low-risk.

The seven demonstration sites are working to:

- Reduce the risk conditions that contribute to the development of diabetes;
- Create social and physical environments that enhance healthy choices; and
- Enhance the ability of individuals, families and communities to take action.

Demonstration sites are using a number of different population health promotion strategies to help reduce the risk factors and conditions associated with type 2 diabetes. Activities include enhancing physical activity options such as community walking trails, healthy eating through the Good Food Boxes, community awareness such as radio broadcasts in Cree and Dene and supporting partnerships among community groups, the Aboriginal community and health districts.

Build Better Tomorrows: Working Together on the Determinants of Health, a conference in February 2002, built on the experiences of the demonstration sites and some Health Canada initiatives to draw more than 300 people, a large proportion of them Aboriginal people to discuss learning and how broad population health promotion approaches could be applied in their communities.

Limitations

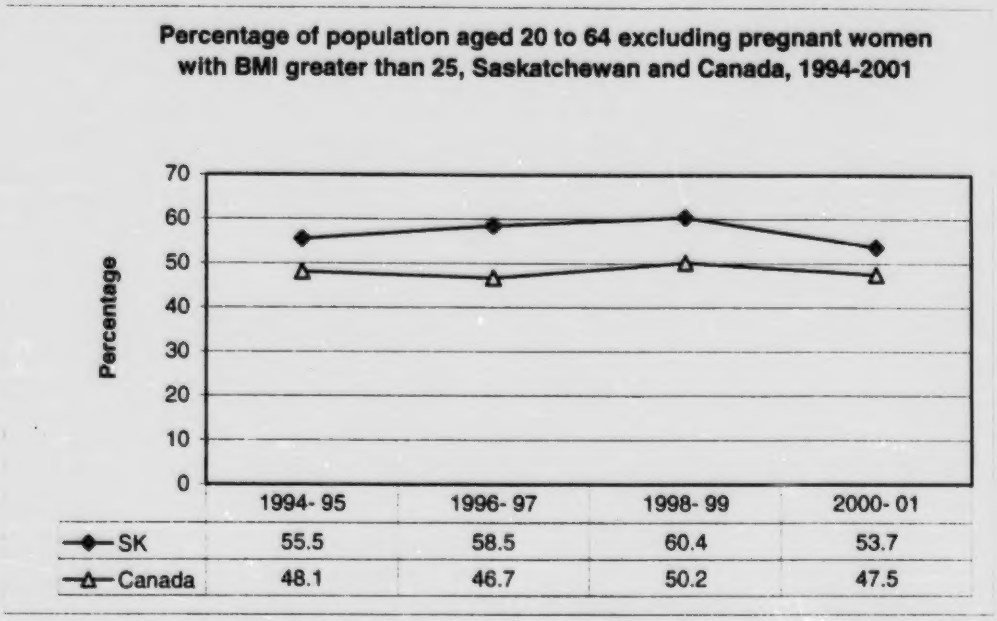
This measure has similar limitations as the physical activity measure above.

Trend

In 2000-01, 53.7 per cent of Saskatchewan and 47.4 per cent of Canadian population aged 20 to 64, excluding pregnant women had BMI greater than 25 (a BMI greater than 25 is deemed to signify overweight or obesity).

The proportion of the Saskatchewan population aged 20 to 64 years, (excluding pregnant women), who had a body mass index greater than 25, fluctuated during the 1994- 2001 period. Over one half (55.5 per cent) of Saskatchewan's population aged 20 to 64 were overweight or obese (BMI greater than 25) in 1994- 95. In 1998- 99, the percentage of the population aged 20 to 64 with BMI greater than 25 increased to 60.4 per cent before decreasing to 53.7 per cent in 2000- 01. The national trend showed a similar pattern.

Figure 34 Body Mass Index: Saskatchewan Trend, 1994-2001



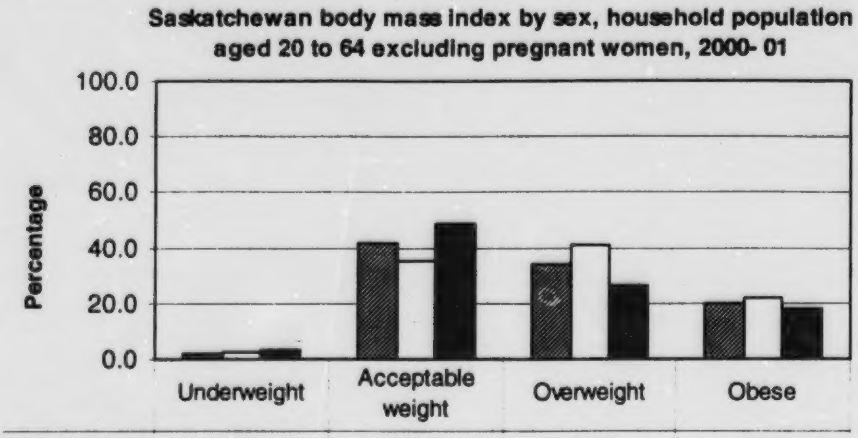
	1994- 95	1996- 97	1998- 99	2000- 01
—◆—SK	55.5	58.5	60.4	53.7
—△—Canada	48.1	46.7	50.2	47.5

Source: Canadian Community Health Survey – Cycle 1.1, 2000; National Population Health Survey, 1994, 1996, 1998; ISQ

Sex and Age

Regardless of age, women were more likely than men to be in an acceptable weight range or underweight. In 2000-01 48.6% of women in Saskatchewan were of an acceptable weight (BMI < 25), as compared to 35.4% of men. More men than women were recorded as being wither overweight or obese in the province in the same year (Figure 35).

Figure 35 Body Mass Index: Saskatchewan Data by Sex, 2000-01



	Underweight	Acceptable weight	Overweight	Obese
▨ Both sexes	2.0	41.9	34.0	19.7
☐ Men	2.5	35.4	41.3	21.5
■ Women	3.2	48.6	26.3	17.9

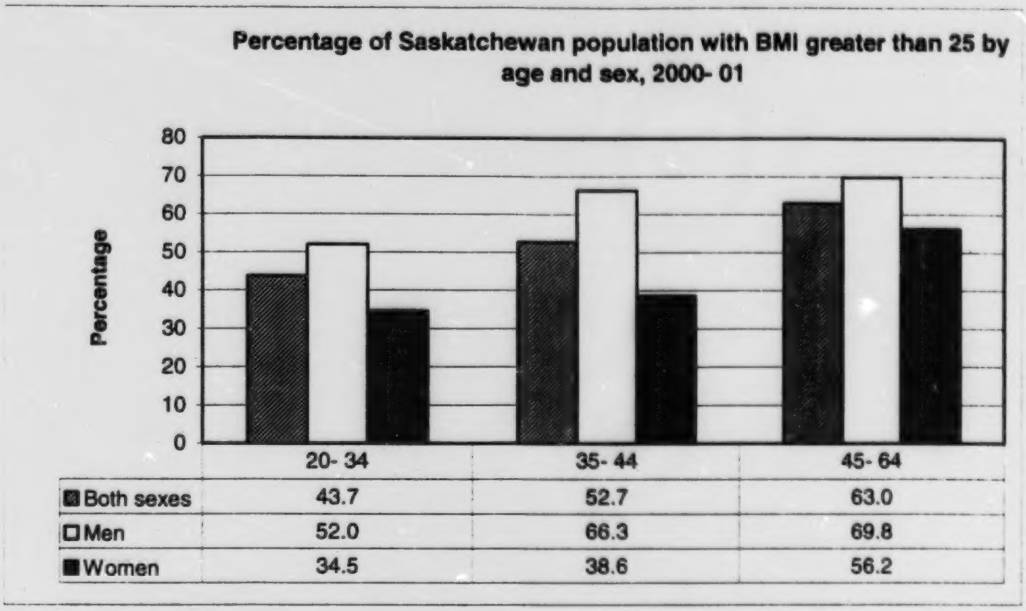
Source: Canadian Community Health Survey – Cycle 1.1, 2000;
National Population Health Survey, 1994, 1996, 1998; ISQ

Note: Data for men aged 20 to 64 who were underweight should be interpreted with caution

Interestingly, according to the 1996/97 National Population Health Survey, women (40%) are much more likely than men (23%) to report recent attempts at weight loss.[85] The analysis also shows that for both men and women, the proportion of overweight individuals increases in successive age groups. As the data produced for this project by Statistics Canada are not age adjusted, one of the possible explanations for Saskatchewan's relatively poor rating on this indicator is that Saskatchewan has a relatively older population.

While the prevalence of having a body mass index (BMI) greater than 25 tended to increase with age for both sexes, the proportion of men who had BMI greater than 25 exceeded that for women in each age group. For example, 52.0 per cent of men and 34.5 per cent of women in the 20 to 34 age group were overweight or obese. These numbers rose steadily with age for both genders.

Figure 36 Body Mass Index: Saskatchewan Data by Age & Sex, 2000-01



	20- 34	35- 44	45- 64
▨ Both sexes	43.7	52.7	63.0
☐ Men	52.0	66.3	69.8
■ Women	34.5	38.6	56.2

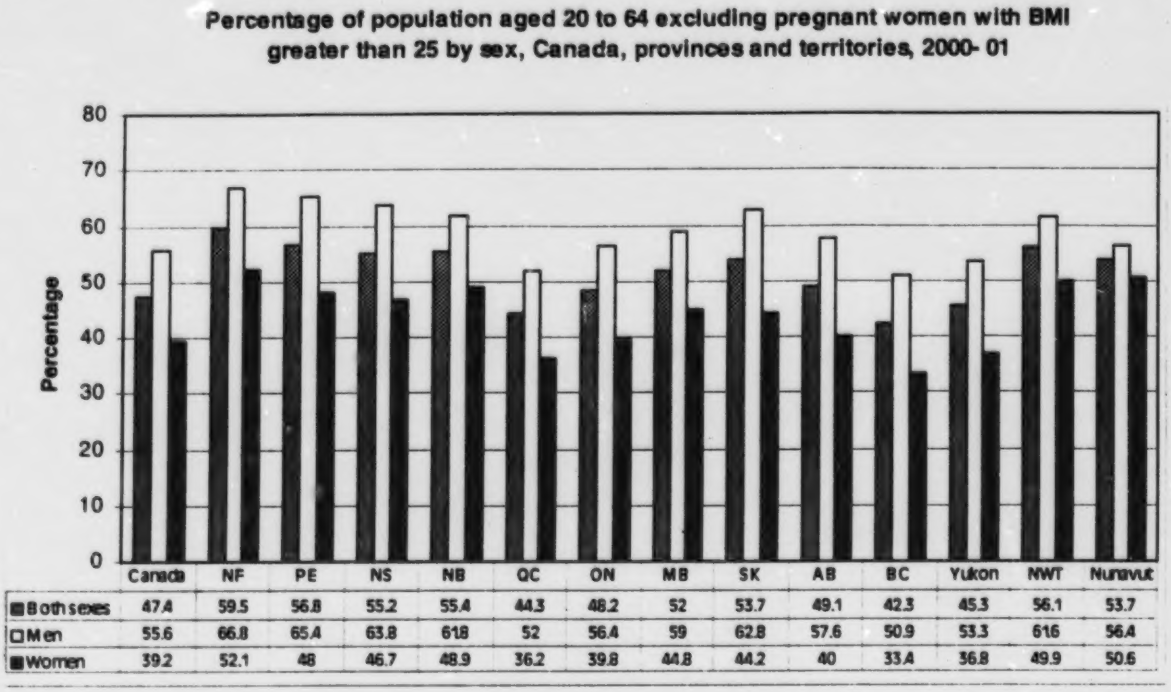
Source: Canadian Community Health Survey – Cycle 1.1, 2000;
National Population Health Survey, 1994, 1996, 1998; ISQ

Provincial/Territorial Comparisons

The percentage of the population in Saskatchewan that are overweight or obese (53.7%) is in the middle of the range of provincial and territorial estimates for BMI greater than 25. British Columbia had the lowest percentage of people (42.3%) reported as being overweight or obese.

In all jurisdictions more men than women were overweight or obese. In Saskatchewan 62.8% of men aged 20 to 64 had a BMI greater than 25 as compared to 44.2% of women.

Figure 37 Body Mass Index: Provincial Comparison, 2000-01



Percentage of population aged 20 to 64 excluding pregnant women with BMI greater than 25 by sex, Canada, provinces and territories, 2000- 01

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	47.4	59.5	56.8	55.2	55.4	44.3	48.2	52	53.7	49.1	42.3	45.3	56.1	53.7
☐ Men	55.6	66.8	65.4	63.8	61.8	52	56.4	59	62.8	57.6	50.9	53.3	61.6	56.4
■ Women	39.2	52.1	48	46.7	48.9	36.2	39.8	44.8	44.2	40	33.4	36.8	49.9	50.6

Source: Canadian Community Health Survey – Cycle 1.1, 2000;
National Population Health Survey, 1994, 1996, 1998; ISQ

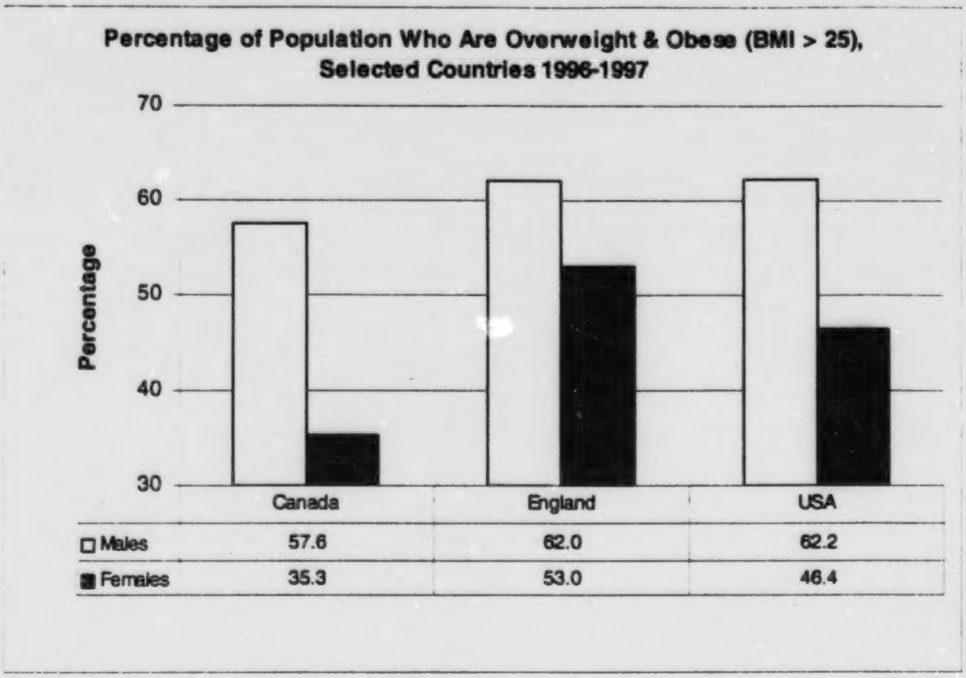
Note: The estimate for women in the Yukon should be interpreted with caution.

International Comparison

Estimates of the percentage of individuals aged 15 and older who are classified as obese (BMI > 30) are available for 15 of the 23 OECD countries where standards of living are similar to those in Canada. The years for which the indicator is available varies from country to country, with Finland being the only country to track body weight data consistently over a long period of time. The disadvantage of these comparisons, however, is that they are based on BMI > 30, i.e. obesity, as opposed to BMI > 25 (overweight). For this reason estimates are provided for individuals classified as overweight based only on data from the UK (Dept. of Health, England), and from the USA (USA Centres for Disease Control and Prevention).

When the category definition is changed to overweight (i.e. BMI 25>), which encompasses the percentage of the population who are obese, as well as those who are likely to experience some health risk as a consequence of their weight, the following trends are observed. Data from Canada are presented for the years 1996-1997, to make the estimates more comparable to those given for the USA and UK for 1997.

Figure 38 Body Mass Index: International Comparison



	Canada	England	USA
□ Males	57.6	62.0	62.2
■ Females	35.3	53.0	46.4

Source: Canadian Community Health Survey – Cycle 1.1, 2000;
National Population Health Survey, 1994, 1996, 1998; ISQ
Department of Health, England; USA Centres for Disease Control & Prevention.

The percentage of the population in Canada regarded as being overweight, and therefore, at some risk of ill health as a consequence of their weight, was somewhat lower than that recorded in either the UK or USA. Similarities between the USA and Canada were observed with respect to the gender difference present, where the trend is for a larger proportion of the male population than female to be classified as overweight. The UK, although evincing a similar trend, had a higher percentage of females classified as being overweight in 1997 than either Canada or the USA.

2.2 Sexually Transmitted Diseases

Unsafe sexual behaviours can lead to serious conditions, such as sexually transmitted diseases (STDs), infertility and HIV infection (although it should be noted that HIV infection is increasingly related to intravenous drug use).

Sexually transmitted disease remains an important public health problem in Canada, representing 36% of all notifiable diseases in Canada in 1995 [86]. Genital chlamydia (*chlamydia trachomatis*) first became nationally reportable in 1990 and emerged as the most prevalent sexually transmitted disease in Canada [87].

Young women bear the burden of chlamydia, especially those in younger age groups (15-19 years) and are often unaware of their infection. Other related health problems that may develop include pelvic inflammatory disease, ectopic pregnancy and infertility. Genital chlamydia may also present in males, however, as urethritis[88]. Unrecognized and untreated cases allow for the transmission of the disease to sexual partners, and thus the proliferation of the disease across the country. Incidence rates of genital chlamydia remain an important health indicator because of the complications that can result from untreated infections, especially the impact it has on women of childbearing age. Furthermore, the economic burden of illness for genital chlamydia in Canada is estimated to be between $41 to $123 million every year [89]. In addition this indicator is a good assessment of health promotion activities aimed at STDs.

Despite this contingency, complete reporting is not necessary for the production of useful information as identification of high-risk groups, and trends in disease patterns can still be assessed which can be of use in the planning of prevention strategies and program evaluations.

Much HIV infection can be prevented by practising safer sex, which entails the use of a condom during any form of penetrative intercourse or the adoption of non-penetrative forms of sexual interaction that prevents the transfer of bodily fluids such as semen, vaginal fluid and blood.[90]

An in-depth analysis of sexual health practices in 1997 revealed that among Canadians who reported having two or more sexual partners in the past year and not using condoms consistently, 53% of men and 38% of women had never been tested. This finding suggests that substantial numbers of Canadians may be HIV-positive, but unaware of their infection.

(a) Chlamydia

For the purpose of this report we will look at the incidence rate of reported genital infections, by calendar year. A confirmed case is defined as laboratory confirmation of infection – i.e., detection of *C trachomatis* by appropriate laboratory techniques in genitourinary specimens.

Controlling the incidence of chlamydia infection remains a major public health concern especially in youth. It is hoped that recent advances in AIDS education will effect decreases in the rates of high-risk behaviours associated with all STDs, and that the incidence rates of chlamydia will decline accordingly. Increased surveillance, prevention and control procedures will all be required if the economic and social burden placed on Canada by chlamydia is to be reduced.

Limitations

There are a number of limitations associated with this measure. To begin with, increasing incidence rates of chlamydia in recent years may be partially accounted for by the advances in diagnostic technology that have been made, resulting in historical and inter-jurisdictional comparability being an issue.

Newer, non-invasive (e.g. urine) testing techniques for chlamydia have likely contributed to increases in the number of tests done as the discomfort experienced with earlier forms of testing such as the swab test is avoided. Thus, not only may more individuals be willing to be tested, but additionally, urine samples are easier for physicians to collect and allow for more specimens to be collected in less time than other techniques do [89]. Indeed, research in British Columbia has indicated that use of new techniques was responsible for increasing the number of tests done by 25% [91]. Although the potential for false-positive results is introduced by the detection of non-clinically relevant cases, these newer methods may lead to more people getting tested. This increase in testing is likely responsible for some of the short-term increase in chlamydia rates, however, as more people get tested and treated, a decrease in the pool of infected individuals in the population will be observed.

Current incidence rates, therefore, must be interpreted in this context of increased reporting, and the improved sensitivity of testing procedures, which can detect low-level infections that could not previously be diagnosed [92]. That increased detection will result from using new DNA amplification methods is particularly likely for men aged 24 years and older, for whom conventional assay measures would most likely have been unable to detect the presence of chlamydia bacterium [93].

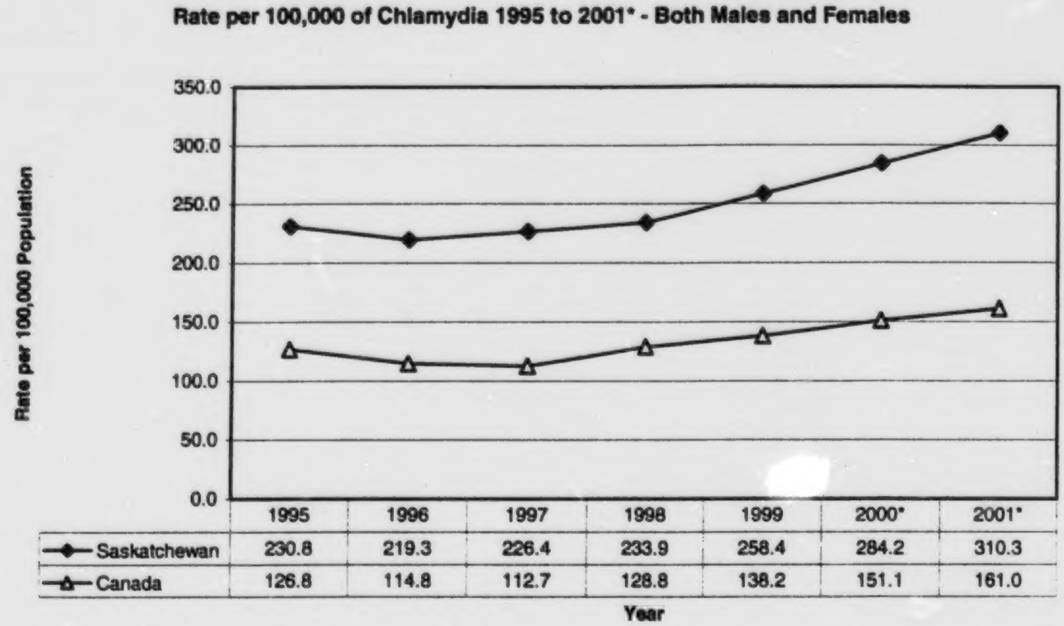
Secondly, this data captures only reported cases and with approximately three quarters of female infections being asymptomatic and about half of male infections, many cases remain undiagnosed.

Recommendation is made to view all chlamydia estimates with caution due to variations in the population estimates used to calculate the rates.

Trend

Rates of chlamydia infection have continued to rise in Saskatchewan, and nationally, since 1995. Furthermore, incidence rates in Saskatchewan have remained higher than the national average at all points in time between 1995 and 2001. Part of this national increase may be partly due to the adoption of more sensitive diagnostic tests introduced around 1997. The continued increase in 1999 and 2001, however, suggests that there has also been a slight trend towards an increasing number of reported cases as well.

Figure 39 Chlamydia: Saskatchewan Trend, 1995-2001



Rate per 100,000 of Chlamydia 1995 to 2001* - Both Males and Females

	1995	1996	1997	1998	1999	2000*	2001*
◆ Saskatchewan	230.8	219.3	226.4	233.9	258.4	284.2	310.3
△ Canada	126.8	114.8	112.7	128.8	138.2	151.1	161.0

Source: Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

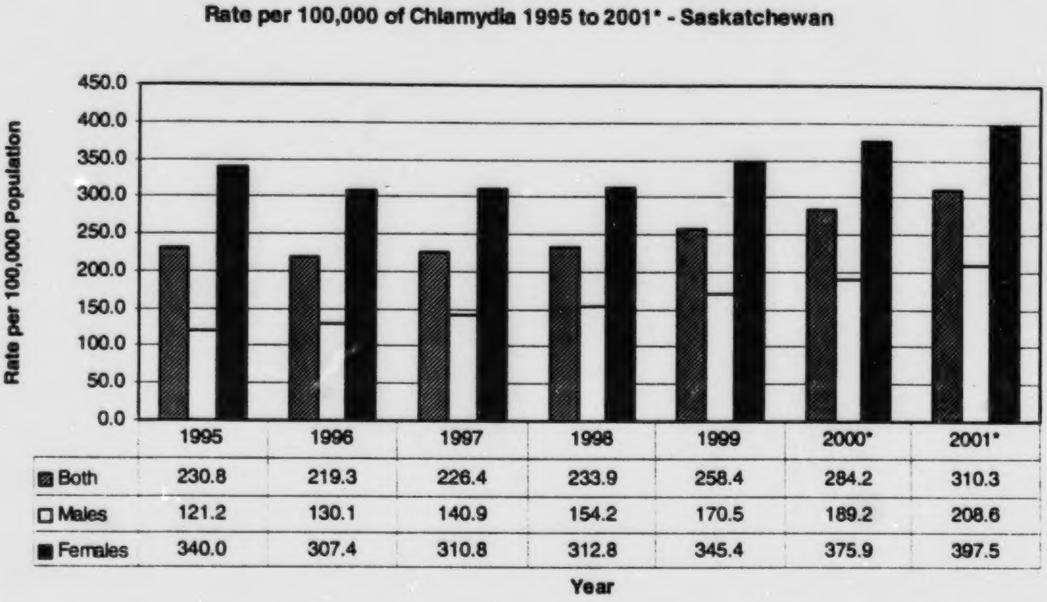
***Note:** Figures for 2000 & 2001 are preliminary and changes are anticipated.

Age and Sex

As is observed nationally, rates of chlamydia in Saskatchewan females are substantially higher than those found for males in the province. This gender difference is likely an artifact of screening, and not epidemiologically reflective of the infection, and as such a result of higher proportions of clinically silent cases in males, for which medical intervention was not sought. This is exacerbated by the lack of screening opportunities that are available for men compared to women.

Sexually active adolescents continue to be the most susceptible individuals to genital chlamydial infections because of the increased likelihood that they will engage in high-risk behaviours such as having numerous sexual partners, engaging in unprotected sex, or if protected, using non-barrier methods of contraception [94]. Other groups that are currently highlighted as populations that should be targeted for increased surveillance include street youth, immigrants from countries with high rates of infection, young men, the incarcerated, ethno-cultural groups including aboriginal people, and the "non-professional sex industry" populations [95]. These groups are at increased risk of genital chlamydia not only because of their rates of high-risk behaviours, but also because they are also less likely to seek routine health care.

Figure 40 Chlamydia: Saskatchewan Trend by Sex, 1995-2001

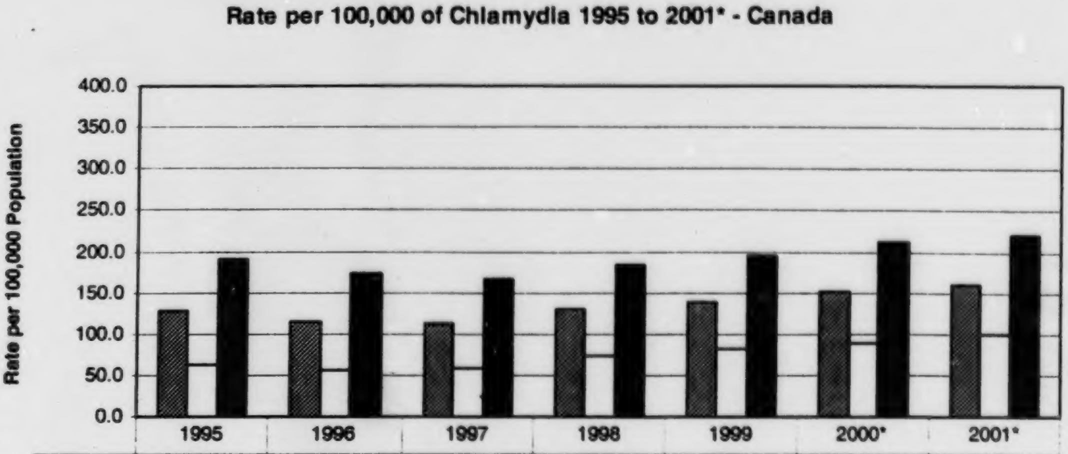


	1995	1996	1997	1998	1999	2000*	2001*
▨ Both	230.8	219.3	226.4	233.9	258.4	284.2	310.3
☐ Males	121.2	130.1	140.9	154.2	170.5	189.2	208.6
■ Females	340.0	307.4	310.8	312.8	345.4	375.9	397.5

Source: Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

***Note:** Figures for 2000& 2001 are preliminary and changes are anticipated.

Figure 41 Chlamydia: Canadian Trend by Sex, 1995-2001



	1995	1996	1997	1998	1999	2000*	2001*
▨ Both	126.8	114.8	112.7	128.8	138.2	151.1	161
☐ Males	62.0	56.0	58.1	73.6	81.4	89.1	99.1
■ Females	190.4	172.4	166.2	182.9	193.7	211.8	221.0

Year

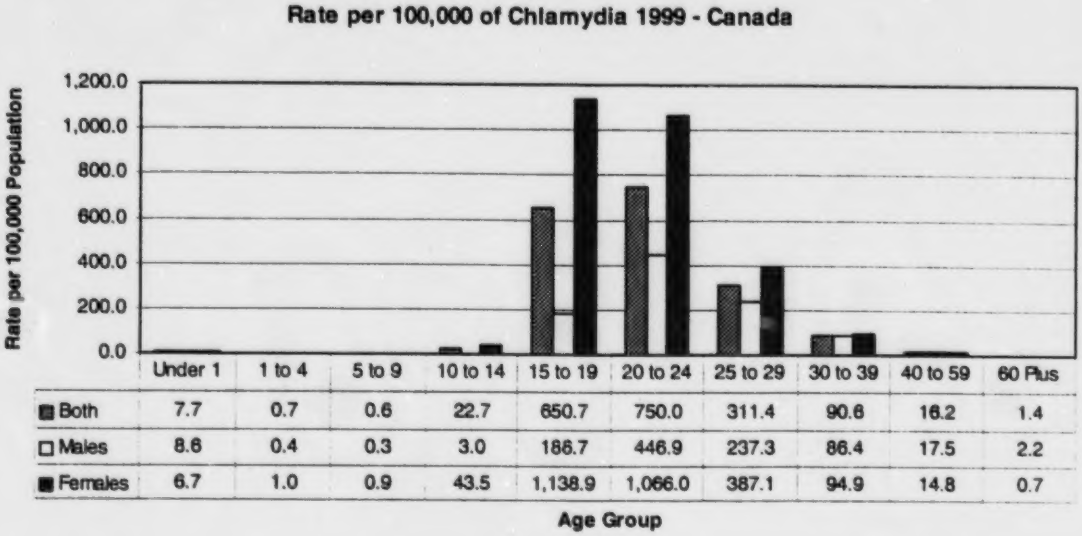
Source: Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

***Note**: Figures for 2000 & 2001 are preliminary and changes are anticipated.

The breakdown of chlamydia rates for the general Canadian population by age are presented for 1999 because data from more recent years is provisional. The most recent preliminary estimates can be viewed in Appendix C (Figure VIII).

The rates of reported chlamydia for the general Canadian population in 1999 are highest among the 20 to 24 year old age group, followed by the 15 to 19 year old age group and then the 25 to 29 year old age group. This pattern is repeated when one examines males individually. Among females, however, the rates are highest for the 15 to 19 year olds, followed by the 20 to 24 year olds and the 25 to 29 year olds. Among the 15 to 19, 20 to 24, and 25 to 29 year age groups, the rates for females are significantly higher than those for males.

Figure 42 Chlamydia: Canadian Data by Age & Sex, 1999



	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40 to 59	60 Plus
▨ Both	7.7	0.7	0.6	22.7	650.7	750.0	311.4	90.6	16.2	1.4
☐ Males	8.6	0.4	0.3	3.0	186.7	446.9	237.3	86.4	17.5	2.2
■ Females	6.7	1.0	0.9	43.5	1,138.9	1,066.0	387.1	94.9	14.8	0.7

Source: Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

Note: Data for 1999 are reported as more recent data from 2000/2001 are preliminary and subject to change.

Provincial/Territorial Comparisons

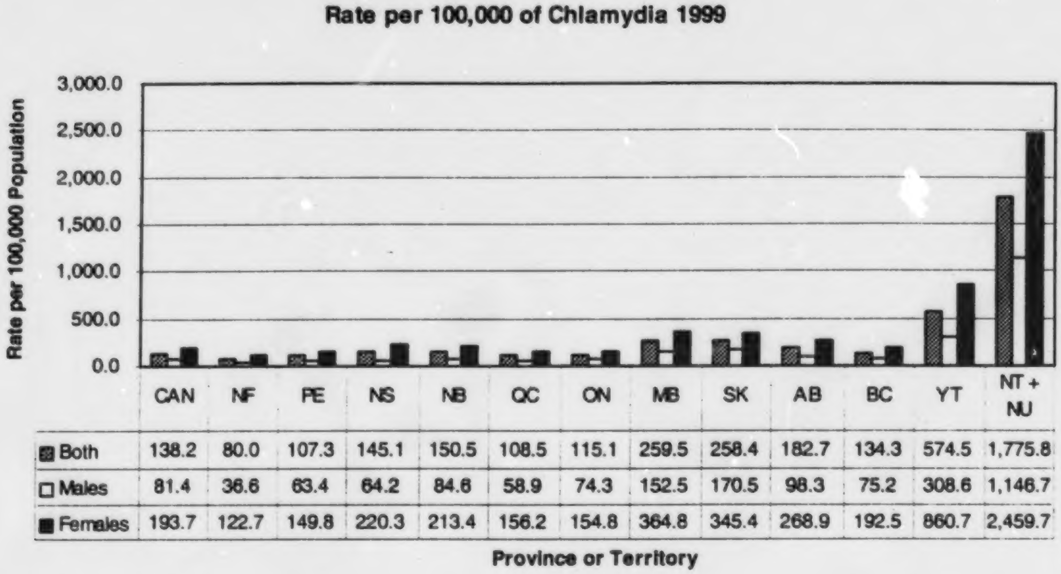
Provincial comparisons are reported for 1999, as more recent data is preliminary and subject to change. Estimates for 2001 can be viewed in Appendix C (Figure IX).

Looking at both males and females, Saskatchewan had a rate of 258.4 reported cases per 100,000. For males, Saskatchewan had a rate of 170.5 reported cases of per 100,000 while females in Saskatchewan had a rate of 345.4 reported cases per 100,000 in 1999.

Age differences are apparent in the incidence rates of reported chlamydia infection with females aged between 15 and 24 years reporting the highest rates nationally in 1999. This is particularly the case for the youngest age group (15-19 years) and there is some indication of a disturbing trend for the disease to be moving to younger females with time, as chlamydia rates in 1989/90 were highest in 20-24 year old females.

The rates of chlamydia infection for males and females in Saskatchewan are similar to those reported for other prairie provinces, and tend to be higher than those reported in other areas of the country, with the exception of the territories, where it is likely that small samples sizes inflate the rates observed, however, a variety of factors are likely to contribute to the geographic distribution of chlamydia throughout Canada. These include differences in screening practices, access to and availability of educational programs and health campaigns, treatment variations (i.e., single-dose versus multidose antibiotic therapy), and the effectiveness of partner notification and tracing procedures [96]. Caution is, therefore, warranted in the interpretation of regional comparisons.

Figure 43 Chlamydia: Provincial Comparison, 1999



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT + NU
▨ Both	138.2	80.0	107.3	145.1	150.5	108.5	115.1	259.5	258.4	182.7	134.3	574.5	1,775.8
☐ Males	81.4	36.6	63.4	64.2	84.6	58.9	74.3	152.5	170.5	98.3	75.2	308.6	1,146.7
■ Females	193.7	122.7	149.8	220.3	213.4	156.2	154.8	364.8	345.4	268.9	192.5	860.7	2,459.7

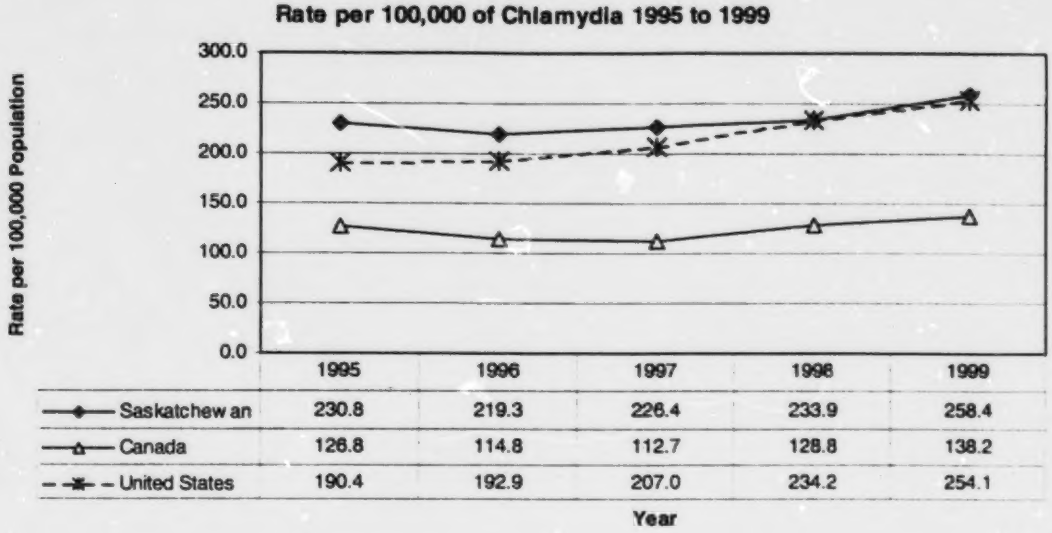
Source: Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

Note: Data for 1999 are reported as more recent data from 2000/2001 are preliminary and subject to change. Nunavut data from 1999 are included with the Northwest Territories.

International Comparisons

The only comparative international data available is that of the USA. The data source for the American data is the Centres for Disease Control and Prevention (http://www.cdc.gov/nchs/fastats/). The reported rates of chlamydia infection are higher in the United States than in the general Canadian population, but are comparable with those of the Saskatchewan population. The rates in the United States show the same increase since 1997 as those in Saskatchewan and the general Canadian population. The rates for Saskatchewan are higher than those of the United States for 1995 to 1997 and are about the same as those for the United States for 1998 and 1999.

Figure 44 Chlamydia: International Comparison, 1995-1999



	1995	1996	1997	1998	1999
—◆— Saskatchewan	230.8	219.3	226.4	233.9	258.4
—△— Canada	126.8	114.8	112.7	128.8	138.2
– –✱– – United States	190.4	192.9	207.0	234.2	254.1

Source: Centres for Disease Control and Prevention (http://www.cdc.gov/nchs/fastats/); and Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

(b) HIV

Human Immunodeficiency Virus (HIV), the asymptomatic, latent state of the Acquired Immunodeficiency Syndrome (AIDS) is a global threat. In 2001, an estimated 40 million people were living with HIV. Although developing countries appear to be bearing the brunt of the epidemic, the disease is also gaining strength in Asia, Eastern Europe, the Middle East, Latin America and the Caribbean.

Canada has not escaped the increasing burden of HIV/AIDS, and although people are living longer with both HIV and AIDS due to the availability of treatments, new infections are still occurring. At the end of 1999, Health Canada's Bureau of HIV/AIDS, STD and TB estimated that 49,800 Canadians were living with HIV/AIDS, a 24 per cent increase from the 1996 estimate of 40,100 [97]. The HIV/AIDS epidemic, therefore, continues to create significant demands on the country's health care and social service systems, and society in general.

The HIV epidemic in Canada has changed from the early epidemic that primarily affected men who have sex with men (MSM) to the current epidemic that primarily affects injection drug users (IDU), MSM and to some extent, heterosexuals (HET)[98].

Heterosexual activity as a mode of transmission has also increased in Canada since 1995, this is most likely due to an increase in the number of positive HIV tests among females in the same time period [99]. Heterosexual risk factors include individuals who have contact with a person at risk for HIV, and individuals who are originally from a country where HIV is endemic. To help address the special needs of women especially at risk for HIV infection, therefore, a National Reference Group on Women and HIV was set up to provide recommendations to Health Canada on suitable policy and program development. The first National conference on HIV/AIDS in Women was also held in Toronto in 2000 to discuss prevention, support, treatment and legal/policy issues.

For the purpose of this report we will focus on the estimates of new diagnoses of HIV infection, based on new positive HIV test reports.

Limitations

HIV rates need to be interpreted with caution for a number of reasons. To begin with, one must keep in mind that under reporting, delayed reporting and changes in testing behaviour all influence estimates of the rate of newly diagnosed cases of HIV from one year to another.

Secondly, changes in the rate of positive HIV testing can provide useful information on the scope and nature of the HIV epidemic in the country. However, although giving some indication of the magnitude of the HIV/AIDS problem in Canada, they do not reflect the full extent of the problem, as these estimates do not include HIV-infected persons who have not been tested, and are unaware of their infection. An estimated one third of people living with HIV/AIDS in Canada are not aware that they are infected [100]. Testing patterns within the general population are also likely to underestimate the actual rate of HIV infection, as individuals who are most at risk (gay men, and intravenous drug users) may resist coming forward for testing. (Note while men who have sex with men represent a smaller proportion of the new cases, such men are still at high risk of infection).

Finally, the use of anonymous testing may encourage more people to come forward as a high degree of confidentiality is assured with this practice. Anonymous HIV testing (AHT), available in eight provinces, is offered through community or public health clinics, sexual health centres and some physicians. The use of AHT site in Ontario have proven to be quite successful in just such a way, serving 5% of the total tested population, most often those who were at high risk of infection in the first place [101].

The extent to which AHT is available varies considerably between the eight provinces in which it is available. The fact that in British Columbia, it is available in any physician's office, and that Ontario and Quebec have a larger number of AHT sites per province may help explain some of the variability in the newly diagnosed cases of HIV on a provincial basis. The rate of newly diagnosed cases of HIV is higher in these three provinces, and may be reflective of the larger numbers of individuals willing to come forward when they are assured confidential testing is in place.

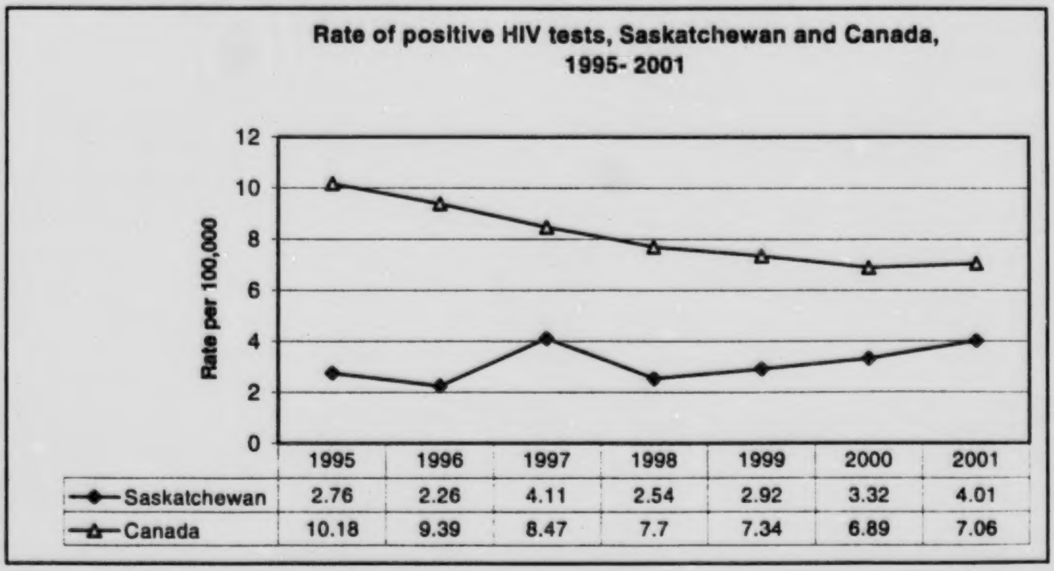
Data collection procedures are being updated throughout the country to enhance the surveillance of HIV. Saskatchewan has recently developed a provincial reporting form to replace the existing national HIV/AIDS reporting form. The production of a streamlined surveillance tool, to capture additional data elements, enhances the collection of information on HIV infection rates[102], and ultimately aids in the development of prevention and treatment programs. Saskatchewan already has in place free HIV antibody testing that is done on an anonymous basis at three Anonymous HIV Testing Clinics within the province.

Trend

Saskatchewan's rate of positive HIV tests per 100,000 population was lower than the national average rate during the 1995- 2001 period. For example, in 1995, the Canadian average rate of 10.18 cases per 100,000 population was nearly four times Saskatchewan's rate (2.76 per 100,000).

Unlike the national trend, Saskatchewan's rate of positive HIV tests increased over the seven-year period. Between 1995 and 2001, Saskatchewan's rate of positive HIV tests rose by 45 per cent from 2.76 per 100,000 in 1995 to 4.01 per 100,000 in 2001. In contrast, the Canadian rate declined by 31 per cent from 10.18 per 100,000 in 1995 to 7.06 per 100,000 in 2001. The gap between Saskatchewan's rate of positive HIV tests and the national rate narrowed during the 1995- 2001 period, declining from a difference of 7.42 per 100,000 in 1995 to 3.05 per 100,000 in 2001.

Figure 45 HIV: Saskatchewan Trend, 1995-2001

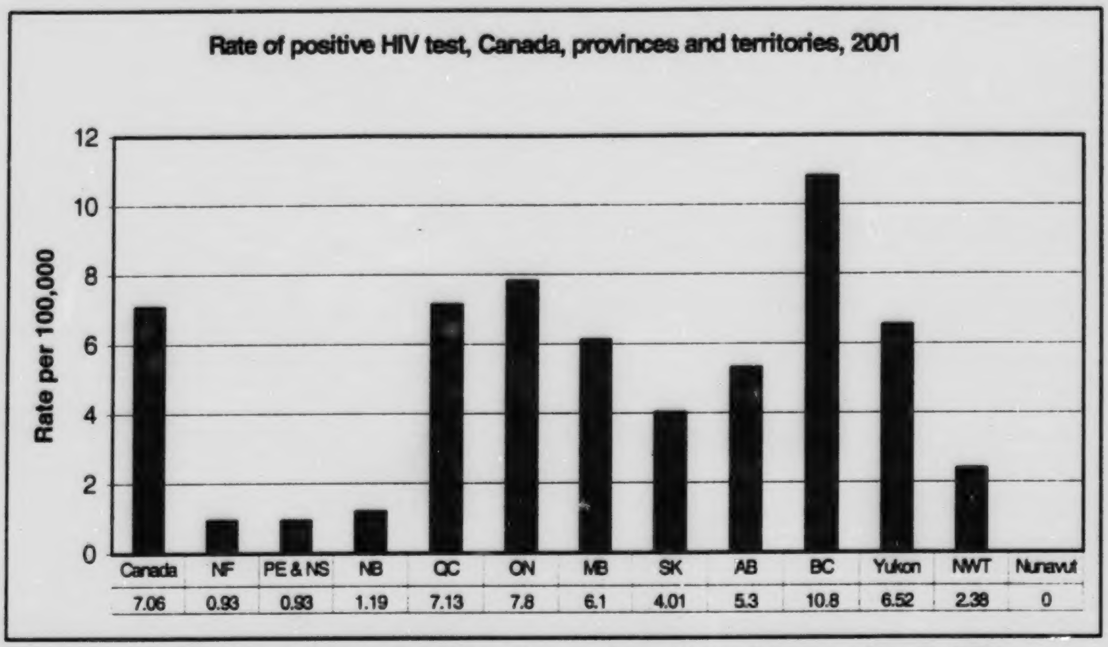


Source: Health Canada. HIV and AIDS in Canada: Surveillance Report to Dec 31, 2001. Division of HIV/AIDS Epidemiology and Surveillance.

Provincial/territorial comparisons

Saskatchewan had the seventh highest rate of positive HIV tests at 4.01 per 100,000.

Figure 46 HIV: Provincial Comparison, 2001



Source: Health Canada. HIV and AIDS in Canada: Surveillance Report to Dec 31, 2001. Division of HIV/AIDS Epidemiology and Surveillance

HIV/AIDS among aboriginal people in Canada remains a pressing issue. Although aboriginal groups represent only 2.8% of the Canadian population [103], they are disproportionately affected, however, by social and economic disadvantage. High rates of poverty, substance abuse, STD's and limited access to health care system are but some of the issues that continue to increase the vulnerability of aboriginal individuals to HIV infection. This has resulted in a rise in the HIV/AIDS epidemic in some aboriginal communities in recent years, particularly those in inner cities. Provinces with large and growing aboriginal communities may see rises in provincial estimates of HIV infection. Indeed, data from British Columbia, Manitoba, Alberta, Newfoundland, Prince Edward Island and the Yukon indicates that Aboriginal people were over-represented among newly diagnosed HIV cases [105]. Rates of positive HIV tests were especially high among aboriginal women compared to the rates reported for non-aboriginal women. Injection drug use appears to be the major risk factor in this community, especially in younger age groups[105].

Several collaborative projects that reflect local needs in a culturally appropriate way have been implemented to help address the HIV/AIDS issues specific to Aboriginal communities.

The National Aboriginal Council on HIV/AIDS (NACHA) was created in May 2001 to address the shared concerns of Aboriginal people about the rising HIV infection. NACHA is structured to reflect the cultural traditions and diversity of all of Canada's Aboriginal populations. Members of First Nations, Inuit, Métis communities together with AIDS organizations and Aboriginal people living with HIV/AIDS advise Health Canada on HIV/AIDS issues that affect all of Canada's Aboriginal peoples.

International Comparisons

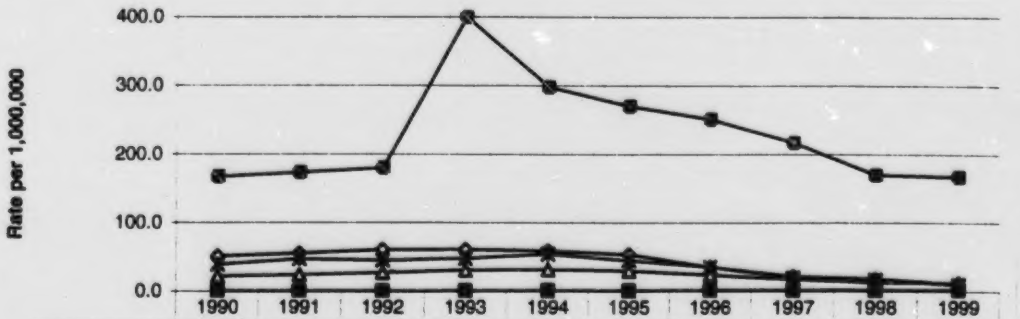
Incidence rates of HIV are available for several countries that are similar to Canada in terms of standard of living. Data from the OECD 2001 report provides recent estimates using the rate per 1 million, whereas Canadian estimates are based on rates per 100,000. Furthermore, no breakdown by risk behaviour categories is provided. Therefore, data from the USA Centres for Disease Control and Prevention National Centre for HIV, STD and TB Prevention (Division of HIV/AIDS Prevention) is also reported, along with statistics on the mode of transmission for newly diagnosed cases from the UK Public Health Laboratory Service.

Together these data sets supplement the incidence rates provided by other countries, and provide some frame of reference for the evolving nature of the disease in terms of risk behaviours. Caution is warranted in interpreting comparisons between countries, however, as it is likely that differences exist in the current practice used for recording HIV cases. Furthermore, no comparisons between data reported at the provincial level, or indeed the national level cited earlier in this section should be compared with the international comparisons presented here. Differences in definition may exist considering that Canadian national data refers to rates of positive HIV tests, whereas the international comparison is on the basis of newly reported HIV infections.

The incidence rate of HIV infection in Canada has followed a similar trend to that observed in other countries. Rates in Canada, the USA, the UK and Australia all tended to increase prior to 1993/94 before decreasing consistently to 1999. Japan is the only country in which a higher rate was reported for 1999 than 1990. The rates in Japan, however, are significantly lower than in any other comparison country. Although rates in the USA are the same in 1990 and 1999 (167.0 per 1,000,000) they have decreased considerably since the recorded high in 1993 when 400 newly diagnosed cases per 1,000,000 were reported. The rates of HIV infection in Canada appear to be most similar to those in Australia and are considerably lower than those reported for the USA in the same time period.

Figure 47 HIV: International Comparison

Newly Reported HIV Infections, per 1,000,000, Selected Countries 1990-99



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◇— Canada	51.3	55.2	60.5	60.9	58.8	53.6	35.4	22.0	18.2	10.7
—■— Japan	0.3	0.3	0.4	0.7	1.1	1.4	2.0	2.1	1.9	2.4
—△— UK	22.0	24.0	27.2	30.7	31.7	30.1	24.1	18.0	13.3	12.3
—●— USA	167.0	173.0	180.0	400.0	298.0	270.0	251.0	217.0	170.0	167.0
—✱— Australia	39.0	47.0	45.0	48.0	54.0	45.0	36.0	20.0	17.0	10.0

Source: Organization for Economic Cooperation and Development

Note: Data reported from OECD is presented as a rate per 1, 000,000 not 100, 000 as is for Canadian national data.

These noted declines in HIV incidence on an international basis is hypothesised to be a reflection of changing behaviour in white homosexual men older than 30 years[104]. This may obscure the levels of high-risk sexual behaviour and drug use in younger populations [105], which continue to propagate the disease. This supposition of a declining rate of HIV in older homosexual men is supported when mode of transmission data is analyzed. The data presented below outlines the percentage of cases by differing modes of transmission for females and males in both the USA and UK.

Figure 48 HIV (Mode of Transmission) : International Data - USA

USA Centres for Disease Control and Prevention

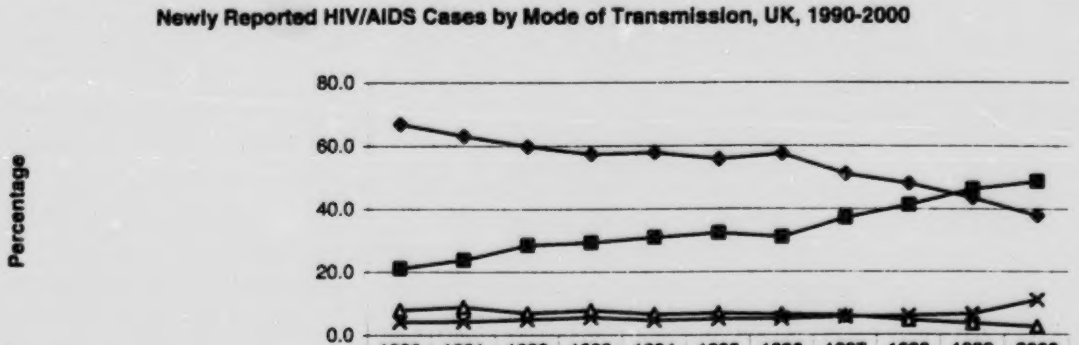
		1995	1996	1997	1998	1999
Female % of Cases						
	Injecting drug use	41.6	36.8	34.7	30.8	28.0
	Haemophilia/coagulation disorder	0.2	0.2	0.3	0.2	0.1
	Heterosexual contact	42.4	44.8	42.0	40.8	40.7
	Transfusion	1.9	2.0	1.3	1.2	1.2
	Undetermined	13.8	16.2	21.7	27.0	30.0
Male % of Cases						
	Men who have sex with men	54.5	52.9	47.6	47.7	45.1
	Injecting drug use	23.6	22.8	22.8	21.1	20.0
	Men who have sex with men & injecting drug use	7.2	6.7	5.9	6.0	5.3
	Haemophilia/coagulation disorder	0.8	0.6	0.4	0.4	0.4
	Heterosexual contact	5.1	6.2	7.0	7.5	8.2
	Transfusion	0.6	0.5	0.5	0.4	0.4
	Undetermined	8.3	10.3	15.9	16.8	20.6

Source: Centres for Disease Control and Prevention National Centre for HIV, STD and TB Prevention (Division of HIV/AIDS Prevention)

The data from the US highlights the changing modes of transmission for males and females over time. A decrease in the most common mode of transmission for men (sex with other men) is noted from 1995 to 1999. The percentage of cases of newly diagnosed HIV due to injection drug use has changed little for men in the United States in recent years, with a slight increase in incidence rates due to heterosexual contact also being observed. For women, reported injection drug use accounts for fewer cases of HIV in 1999 than in any other year, however, incidence due to "undetermined" cause increased in the same time period. In fact the steadily decreasing proportion of "injection drug use" and the increasing proportion of "undetermined" may be related.

The UK data, although not separated according to gender, allows a longer analysis of trends over time. As can be seen sex between men as the main mode of transmission for HIV has also decreased in the UK over time, and by the year 2000 accounted for fewer cases (37.9%) than heterosexual contact (48.7%). Injection drug use as a cause of HIV transmission also decreased in this population and cases of HIV due to undetermined or other causes increased slightly as was also true for the trends recorded in the US.

Figure 49 HIV (Mode of Transmission): International Data - UK



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
—◆— Sex Between Men	66.9	63.0	59.8	57.3	57.9	55.7	57.5	51.1	48.1	43.6	37.9
—■— Sex Between Men and Women	21.1	23.8	28.5	29.3	31.0	32.3	31.0	37.2	41.3	46.4	48.7
—△— Injecting Drug Use	7.9	8.9	6.8	7.7	6.6	6.9	6.4	6.1	4.6	3.5	2.4
—✕— Other/Not Known	4.2	4.3	4.9	5.6	4.6	5.0	5.0	5.6	6.0	6.5	10.9

Source: UK Public Health Laboratory Service

2.3 Unintentional Injury and Suicide

Unintentional injuries are the third most significant cause of death overall in Canada, accounting for 8,663 deaths (29 per 100,000 population) in 1996. Such injuries remain the leading cause of death among Canadians age 1 to 44, and as such are a major contributor to potential years of life lost. Although these types of injuries are sometimes still referred to as accidents, it is estimated that 90% of deaths due to unintentional injuries are preventable. In addition, in spite of a 50% reduction in such deaths among children between 1970 and 1991, unintentional injuries remains the major cause of death among children and youth.[108]

Unintentional ("accidental") injuries includes injuries due to causes such as motor vehicle collisions, falls, drowning, burns, and poisoning, but does not include medical misadventures/complications (ICD-9 E800-E929, excluding E870-E879). Safety equipment has proven successful in preventing several types of unintentional injuries, including: safety belts for automobiles, helmets for motorcycles, bicycles or snowmobiles, lifejackets for watercraft, smoke detectors for protection against house fires and child-proof container lids on medication and other potentially hazardous products to prevent poisoning.[108]

Potential years of life lost as a result of premature death (i.e., death prior to age 75) due to unintentional injuries measures the adequacy and effectiveness of injury prevention efforts, including public education, community and road design, prevention, emergency care, and treatment resources.

Suicide is a tragic event and an important cause of potential years of life lost. In 1996 there were 3,941 suicides in Canada – almost 11 per day.

Income adequacy, through its relationship with emotional well-being, is a significant contributor to suicide rates observed between populations. Analysis of mortality data from Canadian urban areas found significantly higher age-standardized suicide rates among residents of the poorest neighbourhoods (Wilkins, Adams & Brancker, 1989) [113]. Amongst those especially vulnerable to prolonged periods of income inadequacy are lone-parent mothers and their children, Aboriginal people, people with disabilities and immigrants who are visible minorities.

In addition, the rates of suicide in aboriginal communities exceed those observed in the general population. A report by the federal government on aboriginal health issues indicating that the age standardized rates of suicide in aboriginal populations were double that found for Canada as a whole (Health & Welfare Canada, 1992, p 33.). Further research reported that rates on reserve were higher than those off reserve and related to overcrowded households, more single-parent families, and lower average income and education levels (Cooper et al., 1992)[113]. Although national data on suicide rates in Inuit populations are hard to obtain, surveys indicate alarming high rates in young males. This is supported here with reference to the high rates of PYLL due to suicide found for the Yukon, Northwest Territories, and Nunavut in particular.

(a) Potential years of life lost due to unintentional injury

The PYLL reported in this section is an estimate of the total number of years of life "lost" when people die prematurely from an unintentional injury. PYLL is expressed as a rate per 100,000 population. High PYLL rates reflect a high incidence of premature mortality; conversely, low PYLL rates indicate a low degree of premature mortality. [Refer to Appendix A]

The extent of the economic burden placed on society by premature mortality due to unintentional injury has been recognized by those working in injury prevention and control. It is also an area lacking in detailed information.

The measurement of the potential years of life lost due to unintentional injury, therefore, provides some indication of the need for further research in injury prevention, and highlights the extent to which such prevention initiatives can improve the lives of Canadians, economically and socially.

Limitations

Differences in definition of unintentional injuries exist, therefore, numbers continue to be under-reported as many sources persist in referring to unintentional injuries as accidents.[108] In addition, changes over time may reflect differences in the official reporting and certification of unintentional injury deaths.

PYLL based on < age 75 will differ from published data from most previous Canadian sources. The choice of age as 70 or 75 is arbitrary, and does not greatly affect time trends or inter-provincial comparisons. Furthermore, environmental, socio-cultural and economic risk factors all contribute to the likelihood of death by unintentional injury, therefore, other preventative services other than health care can have an impact on unintentional injury rates.

The use of existing databases does not allow for analysis of populations defined other than by geography, age, or gender. For example, separating out groups based on ethnicity, social or economic situation is not possible. There is also a lack of consistent standards for injury groupings across jurisdictions, and it is possible that jurisdictions may use different groupings for categories. [106]

Trend

A gradual reduction in the potential years of life lost (PYLL) as a result of unintentional injuries occurred from 1989 (1281.0 years per 100, 000) to 1999 (1053.7 years per100, 000). The rate of change remained relatively stable from 1989-1995, where premature death for both males and females dropped in 1996 (893.3 years per 100, 000) after reaching its second highest rate (1798.3 years per 100, 000) in the ten-year period in 1995. The potential years of life lost per 100, 000 increased again in 1997 (1164.9 years per 100, 000) with smaller fluctuations being recorded for the following two years.

Although the rates of premature mortality have changed only slightly between 1989 and 1999, more premature deaths are still recorded due to unintentional injury than other serious health problems. In fact, unintentional injury is the leading cause of death for people under the age of 35, thus contributing to the high rates of premature mortality reported here.

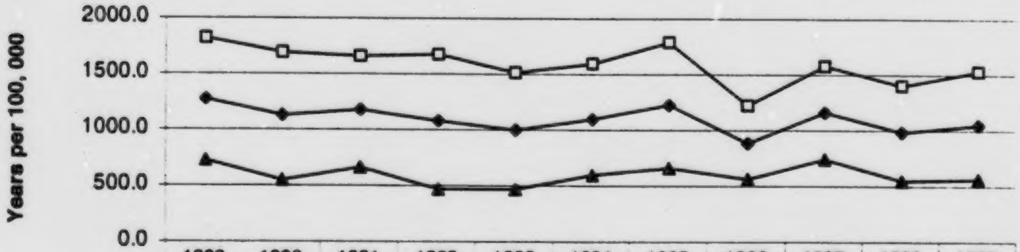
Sex and Age

The decrease in PYLL between 1995–1996 is mostly a result of the dramatic reduction in male PYLL. The difference in the potential years of life lost per 100, 000 of the population for males (578.3 years per 100, 000) was approximately 6 times higher than for females (96.1 years per 100, 000) in the same time period (1995 – 1996). Female rates of premature death from unintentional injury remained consistently lower than males across time, fluctuating between a low of 464.0 years per 100, 000 in 1992 and a high of 740.4 years per 100, 000 in 1997. Male PYLL, on the other hand fluctuated at a much higher rate, the low being 1220.0

years per 100, 000 in 1996, with the highest rate being recorded in 1989 (1828.3 years per 100, 000).

The cause of accidental death also varies with age, with falls in the elderly representing the most common cause of premature mortality in the aging, with motor vehicle and traffic collision accidents being the leading cause of PYLL due to unintentional injury in younger age groups – predominantly young men. Male rates of PYLL are higher than for females, regardless of age or indeed provincial location. Men are more likely to engage in aggressive and high-risk behaviours such as increased alcohol consumption, and high-speed driving that predisposes them to higher rates of accidents and injuries [107]. In addition, men traditionally work in more dangerous occupations.

Figure 50 PYLL Unintentional Injury: Saskatchewan Trend, 1989-99


Potential Years of Life Lost due to Unintentional Injuries in Saskatchewan, Population aged 0-74 years, 1989-99

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both	1281.0	1126.2	1172.2	1076.8	1000.4	1102.0	1233.3	893.3	1164.9	979.6	1053.7
—□— Male	1828.3	1692.4	1667.8	1679.6	1521.5	1601.1	1798.3	1220.0	1580.7	1407.9	1533.8
—▲— Female	724.1	550.4	668.8	464.0	470.0	593.5	657.3	561.2	740.4	542.8	564.5

Source: Statistics Canada, Vital Statistics, Death Database, and Demography Division (population estimates)

Provincial/territorial comparisons

The PYLL resulting from unintentional injuries for both genders was high in Saskatchewan in 1999. The lowest recorded rate is in Ontario (520.3 years per 100, 000). The PYLL for men only in Saskatchewan (1533.8 years per 100, 000) was second highest among the provinces.

Males in Ontario had the lowest PYLL in 1999 (774.1 years per 100, 000) and this rate fell below the national average for men in Canada (1036.0 years per 100, 000). Female rates of premature death remain consistently lower than males regardless of province.

Saskatchewan's rate of PYLL for females (564.5 years per 100, 000) is similar to several other provinces across the country. The lowest PYLL for females due to unintentional injury was recorded in Ontario (266.7 years per 100, 000), and Newfoundland (279.8 years per 100, 000) in 1999.

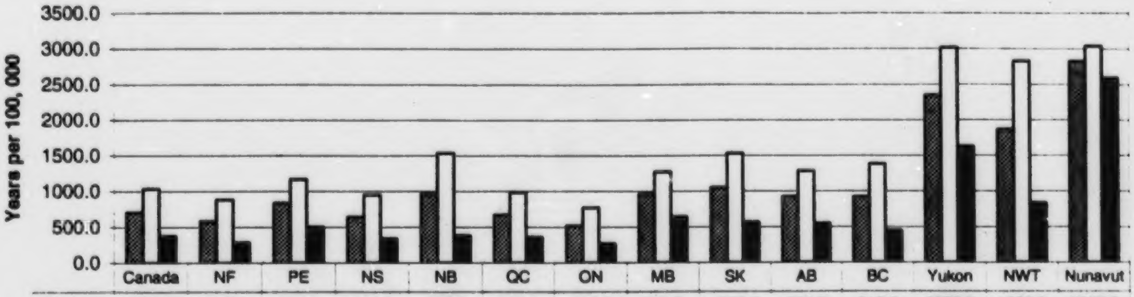
A 1999 Health Canada report [108] highlights the need to address the high number of deaths due to unintentional (and intentional) injury in Aboriginal communities. Aboriginal people may be at greater risk of accidental injury due to their often isolated residence, poorer physical environment, housing conditions, and lifestyle factors. Although injury patterns are similar to that of the general population, the rate is much higher.

Prevention strategies, uniquely designed for Aboriginal communities are in place in Saskatchewan. The Aboriginal Injury Surveillance System pilot project that was started in 1997 in Northern Saskatchewan focused initially on putting together accident prevention teams that consisted of community and mental health professionals, care workers, nurses, school and RCMP representatives. Injury surveillance data was collected for use in putting prevention programs in place [109]. The Saskatchewan Safety Council also operates industrial safety seminars on a yearly basis, as well as injury prevention symposiums that focus on motor vehicle accidents, alcohol related injuries, and accidents affecting the elderly, among other topics.

The Institute for Agricultural Rural and Environmental Health (I-ARE-H) at the University of Saskatchewan works with a Farm Coalition to maintain farm injury surveillance in the province. Isolated programs are unlikely to have a major impact, however, on the current rates of premature mortality due to unintentional injury observed.

Figure 51 PYLL Unintentional Injury: Provincial Comparison, 1999

Potential years of life lost due to unintentional injury, population aged 0 -74 years, Canada, Provinces and Territories, 1999



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	706.6	582.0	837.0	645.6	962.7	673.5	520.3	961.2	1053.7	924.7	919.6	2350.7	1866.7	2827.8
☐ Male	1036.0	883.1	1172.4	954.9	1535.3	985.5	774.1	1273.5	1533.8	1286.5	1384.7	3018.9	2829.0	3039.6
■ Female	374.5	279.8	502.9	337.8	384.1	360.0	266.7	643.2	564.5	548.1	448.2	1630.9	833.6	2594.2

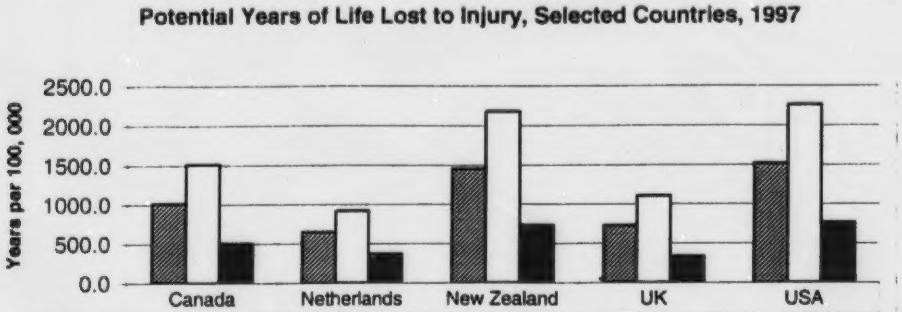
Source: Statistics Canada, Vital Statistics, Death Database, and Demography Division (population estimates)

Note: Potential years of life lost for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

International Comparison

International data from OECD 2001 provides estimates of potential years of life lost before age 70 for mortality due to unintentional injury.

Figure 52 PYLL Unintentional Injury: International Comparison



	Canada	Netherlands	New Zealand	UK	USA
▨ Both	1015.3	651.2	1455.0	728.3	1520.4
☐ Male	1513.0	921.5	2182.5	1107.3	2263.7
■ Female	504.7	371.2	732.2	334.6	764.1

Source: Organization for Economic Cooperation and Development

The estimates provided of the PYLL due to unintentional injury in Canada are comparable to several countries in the OECD 23. For both genders, the highest rates of premature death from this cause are found in the USA (1520.4 years per 100, 000), and New Zealand (1455.0 years per 100, 000). The Netherlands and the UK reported the lowest rates internationally in 1997 (651.2 and 728.3 years per 100, 000 respectively). A similar gender difference is found across all countries, with male rates of PYLL due to injury exceeding that of females. The lowest rate of premature death in females being recorded in the UK in 1997 (334.6 years per 100, 000), with the Netherlands having low rates of male premature mortality (921.5 years per 100, 000) as a result of unintentional injury.

(b) Potential years of life lost due to suicide

PYLL reported in this section is an estimate of the number of years of life "lost" when people die prematurely from suicide. Rates are presented as years of life lost from suicide for every 100,000 population. High PYLL rates reflect a high incidence of premature mortality; conversely, low PYLL rates indicate a low degree of premature mortality. [Refer to Appendix A]

Limitations

There are a number of limitations associated with this measure. To begin with trends and rates associated with suicide need to be interpreted with caution since official statistics tend to under-report suicide. In addition, changes over time may reflect differences in the official reporting and certification of suicide deaths.

Secondly, PYLL based on age 75 will differ from published data based on most previous Canadian sources, which used age 70 as a base. The choice of age as 70 or 75 is arbitrary, and does not greatly affect time trends or inter-provincial comparisons. Furthermore, environmental, socio-cultural and economic risk factors all contribute to the likelihood of death by suicide, therefore, other preventative services other than health care can have an impact on suicide rates.

Finally, suicide has been described as an action rather than an illness (National Task Force on Suicide in Canada, 1987). As such, the need to identify the causal and triggering factors remains a goal for health professionals from a variety of disciplines, attempting to reduce the economic and social burden premature death from suicide places on the population. The potential years of life lost data presented here highlight the extent of the problem on a national and provincial level. A trend since the 1950s for increasing rates of young suicide (particularly young men in their late teens and early twenties) has lead to suicide being ranked third in the causes of PYLL for men, and sixth for women, which is still significantly ahead of some other serious health problems[110].

Trend

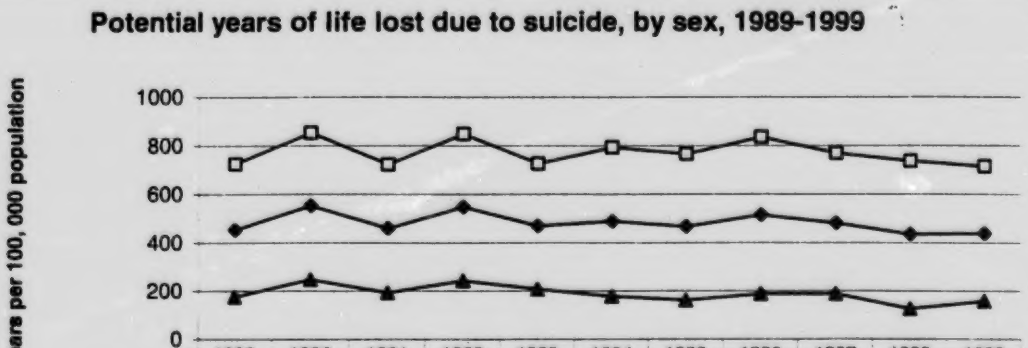
PYLL in Saskatchewan due to suicide has fluctuated little between 1989 and 1999. The highest rates for both males and females collectively, occurring in 1990 (552.1 years per100,000), and the lowest in 1998 (434.3 years per 100,000).

Sex and Age

PYLL due to suicide is substantially higher for males than for females at every time point. In 1990 the male PYLL (852.8 years per 100,000) due to suicide was higher than in any other year in this time frame, with 1999 have the lowest recorded rate (714.6 years per100, 000). Female rates, although substantially lower than males, were again slightly elevated in 1990 (246.3 years per 100,000), and lower again in 1998 (126.2 years per 100,000).

The rates of premature death from suicide peaked for the general population in Saskatchewan in 1992, subsequent years showing some indication of a declining trend. Interestingly, this was the same year that the Saskatchewan Suicide Prevention Program was initiated through Child and Youth Mental Health Services. This initiative, designed to provide services related to suicide prevention, was planned and delivered by health districts throughout the province, in collaboration with community partners. Within the scope of this program, is the provision of trained staff, who are in place to assist communities in their capacity to respond to at risk individuals, and support the training and education of professional and non-professional caregivers (Saskatchewan Health Website, Programs and Services, Suicide Prevention Program) [111]. It is unlikely, however, that the scope of this project was large enough to account completely for the fluctuations in the time trend data reported here.

Figure 53 PYLL Suicide: Saskatchewan Trend, 1989-99



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both	452.3	552.1	459.8	547.8	468.8	488.6	466.2	514.2	481.0	434.3	438.7
—□— Male	724.9	852.8	722.9	847.9	726.6	793.6	765.8	835.5	769.4	736.5	714.6
—▲— Female	174.9	246.3	192.6	242.6	206.5	177.9	160.9	186.3	186.7	126.2	157.5

Source: Statistics Canada, Vital Statistics, Demography Division (population estimates); ISQ

Other possible contributory factors to changes in suicide rates are alterations in the levels of unemployment in the population. Although the literature is far from consistent with respect to the role this variable has on suicide, there has been some indication that unemployed individuals commit suicide more frequently than people who are employed (Platt, 1984) [112]. On a provincial basis, however, population studies rarely find a significant relationship between higher suicide rates in regions marked by higher levels of unemployment. This is most likely due to the confounding influence of other variables associated with unemployment such as age and level of education.

The sex difference in the premature mortality rate from suicide also requires some explanation. Consistently, male rates of PYLL due to suicide exceed those of females. Although higher rates of attempted suicide are reported for women, more men are successful. It has been suggested that women are more likely than men to have stronger social supports, to feel that their relationships are deterrents to suicide, and to seek psychiatric and medical intervention, which may contribute to their lower rate of completed suicide. It is suggested that men in comparison are more likely to use alcohol and other drugs to cope with stressful life events, rather than seek medical or psychiatric help. The fact that alcohol and substance abuse problems are risk factors for suicide, further suggests that rates of premature mortality are likely to be higher in males than females. Research has also suggested that males respond more strongly to changes in social and economic conditions than women, economic stress factors such as unemployment, income and wealth all playing a more important role in male suicide than female [113].

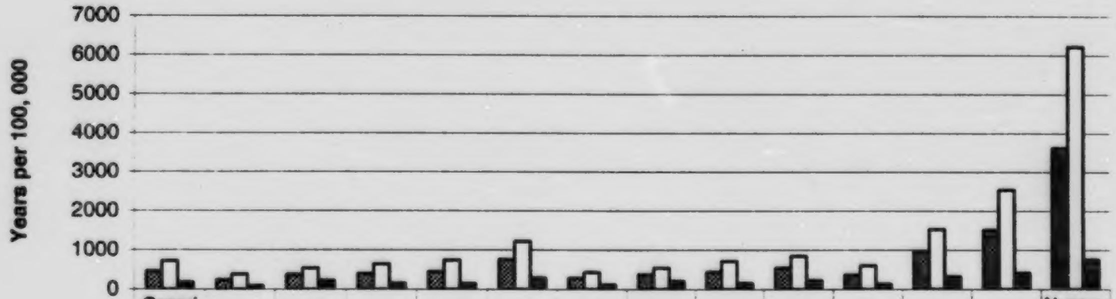
Provincial/territorial comparisons

Saskatchewan's rate of PYLL due to suicide (438.7 years per 100,000) fell below the national average for men and women in 1999 (453.2 years per 100,000). Newfoundland had the lowest PYLL (233.6 years per 100, 000) due to suicide.

Regardless of jurisdiction, male rates of premature death due to suicide far exceed those of females. In Saskatchewan, PYLL for males (714.6 years per 100, 000) is lower than the national average, with again a markedly lower rate for females (157.5 years per 100,000).

Figure 54 PYLL Suicide: Provincial & Territorial Comparison, 1999

Potential years of life lost due to suicide, by sex, Canada, provinces & territories, 1999



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	453.2	233.6	377.8	395.9	446.3	755.5	277.8	374.7	438.7	545.0	369.0	950.8	1515.4	3619.1
☐ Male	724.7	379.9	535.7	639.0	739.9	1218.3	437.8	543.0	714.6	848.9	603.8	1533.2	2544.7	6222.3
■ Female	179.4	86.8	220.5	153.9	149.5	290.5	117.8	203.4	157.5	228.7	131.0	323.5	410.4	749.1

Source: Statistics Canada, Vital Statistics, Demography Division (population estimates); ISQ

Note: Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

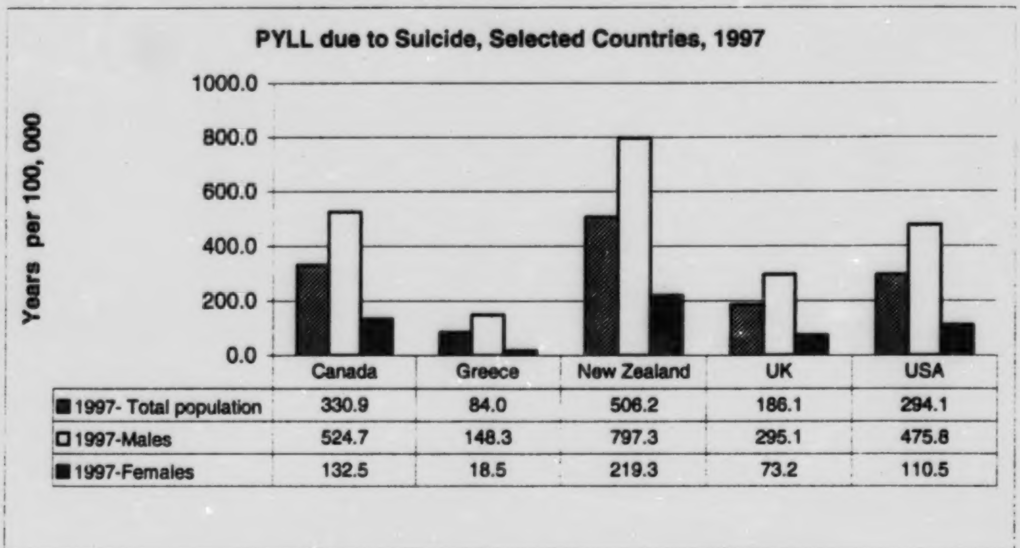
The fact that suicide is more prevalent in younger populations may lead to provincial variations in PYLL due to suicide. Provinces where young people make up a substantially larger percentage of the population may experience higher rates of suicide as a consequence of their demographic profile.

International Comparison

It should be noted that different countries use different age cut-offs for determining PYLL. Specifically, in Canada all deaths before the age of 75 are considered premature and will be included in the PYLL estimate; OECD uses age 70 as the cut-off. These differences do not disallow comparisons between countries using the OECD data, however, they do mean that the OECD estimates differ from the Canadian. These comparisons must also be interpreted with caution, as it is likely that differences in the definition of suicide also exist between countries.

With reference to other countries, Canada's rate of PYLL (330.9 years per 100, 000) due to suicide is somewhat similar to other OECD member states. It is slightly higher than the rates for both men and women found in the USA or UK (294.1 and 186.1 years per 100, 000 respectively). The highest recorded rate of premature death due to suicide was found in New Zealand (506.2 years per 100, 000), and the lowest in Greece (84 years per 100, 000). This was evident with respect to gender differences too. Again, PYLL due to suicide in males was substantially higher than the PYLL of females. This difference in gender related PYLL due to suicide is largest in New Zealand the male PYLL is nearly three times that of females. The smallest difference between males and females is reported for Greece, where rates of premature mortality from suicide are comparatively low for both males and females.

Figure 55 PYLL Suicide: International Comparison



	Canada	Greece	New Zealand	UK	USA
■ 1997- Total population	330.9	84.0	506.2	186.1	294.1
□ 1997-Males	524.7	148.3	797.3	295.1	475.8
■ 1997-Females	132.5	18.5	219.3	73.2	110.5

Source: Organization for Economic Cooperation and Development

Addressing the rates of premature mortality in Canada requires an approach that follows a broad model of crisis intervention. The original report of the Task Force for Suicide in Canada outlines a three prong approach: suicide prevention through reducing societal risk factors; intervention strategies that involve the training of health personnel to detect individuals at risk earlier, follow-up management and treatment; and finally suicide ‘postvention’ which refers to the provision of care and support to the survivors of suicide. Further research is also needed to improve understanding of the variation in suicide rates among different segments of the population, and to help address the multiple risk factors that likely lead to premature mortality by suicide.

CHAPTER 3: **A STORY ABOUT PUBLIC HEALTH**

Major public health problems from the past, such as smallpox, polio, cholera, measles and the plague are gone or very rare in Canada today, but many new challenges remain. Communicable diseases continue to affect thousands of Canadians each year [114]. These diseases are transmitted directly or indirectly from one person to another.

Health protection and disease prevention programs are designed to anticipate, avoid and address these and other immediate and imminent threats to health. In this chapter of the report we will focus on three areas – vaccine-preventable diseases, public surveillance and protection.

3.1 Vaccine-Preventable Diseases

For the purposes of this section three examples of vaccine-preventable diseases will be analyzed: measles, Haemophilus influenzae b (Hib) and Invasive meningococcal.

The Pan-American Health Organization adopted the goal of measles elimination by 2000; it is also the only national goal and objective that has been adopted by all provinces and territories. Two doses of measles vaccine are required for complete protection; the first dose is given at 12 months and the second dose prior to school entry, at either 18 months or 4-6 years of age. In the absence of global eradication, maintaining measles elimination requires ongoing, enhanced surveillance and continued high immunization coverage rates.

Hib was the most common cause of bacterial meningitis and a leading cause of other serious invasive infections in children prior to the introduction of Hib vaccines. Vaccine preventable cases are now rare. Four doses of the vaccine are given in combination with diphtheria, pertussis, tetanus, and polio before the age of 2 years.

A new generation of very effective protein conjugate vaccines is now available against the Group C strain of meningococcal disease which can be given to infants as young as two months of age. The National Advisory Committee on Immunization (NACI) recommends three doses of this vaccine at two, four and six months of age for routine immunization. Other meningococcal conjugate vaccines, which are anticipated to confer long-term immunity against multiple serogroups (strains of the disease), are under development. Epidemiological data on invasive meningococcal disease will enable evidence-based program planning and evaluation.

(a) Measles

Measles is a severe respiratory tract infection that kills nearly one million children per year world-wide.[115] Eliminating measles is a highly desirable goal, internationally as well as in Canada [116].

The measles vaccine was introduced in Canada in 1963 [117], but new two-dose immunization schedules are now considered as the best schedule for diminishing the number of susceptible children, and decreasing the likelihood of outbreaks occurring from imported cases. The routine administration of a second dose of measles vaccine to young children has lead to the successful eradication of indigenous measles in other countries. Eliminating the threat of measles on a global basis ultimately leads to there being little need for vaccination programs, which has the potential to spare future generations a substantial economic cost.

The formal introduction of two-dose measles programs in Canada has been in place since 1996. Catch-up immunization programs were also implemented in several provinces in the same year for all school-aged children, and in some provinces such as Quebec and British Columbia, for children aged 18 months [118].

For the purposes of this section the rate of new cases of measles reported by year will be the basis of the analysis. A confirmed case of measles is defined as laboratory confirmation of infection in the absence of recent immunization with measles-containing vaccine; isolation of measles virus from an appropriate clinical specimen or significant rise in measles specific antibody titre between acute and convalescent sera, or positive serologic test for measles IgM using a recommended assay or clinical case in a person who is epidemiologically linked to a laboratory confirmed case.

Limitations

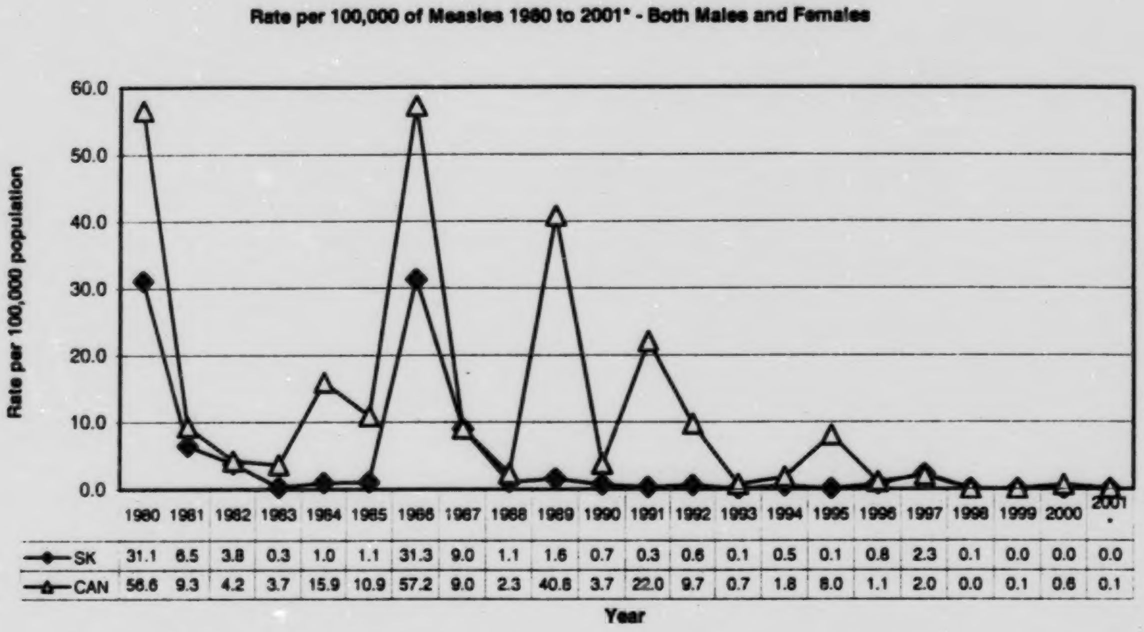
The nature of this disease is such that it occurs as a periodic outbreak, which makes data subject to significant fluctuation and potentially misinterpretation. Since 1998, all measles cases are imported or import-related. Data for 2001 is provisional.

Incidence of the disease only reflects cases that are diagnosed and not those that go unreported, or indeed are misdiagnosed.

Trend

Figure 56 clearly shows periodic outbreaks of measles. Otherwise, the rate of measles has been steadily declining. The Saskatchewan rate has generally been lower than the Canadian rate in the past twenty years. In the past ten years, Saskatchewan has not had an outbreak of measles, although there have been a few in other parts of Canada.

Figure 56 Measles: Saskatchewan Trend, 1980-2001



	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001*
◆ SK	31.1	6.5	3.8	0.3	1.0	1.1	31.3	9.0	1.1	1.6	0.7	0.3	0.6	0.1	0.5	0.1	0.8	2.3	0.1	0.0	0.0	0.0
△ CAN	56.6	9.3	4.2	3.7	15.9	10.9	57.2	9.0	2.3	40.6	3.7	22.0	9.7	0.7	1.8	8.0	1.1	2.0	0.0	0.1	0.6	0.1

Source: Provinces and territories, Notifiable Disease Reporting System (1980 to 1997), Enhanced Surveillance System (1998 to 2001)

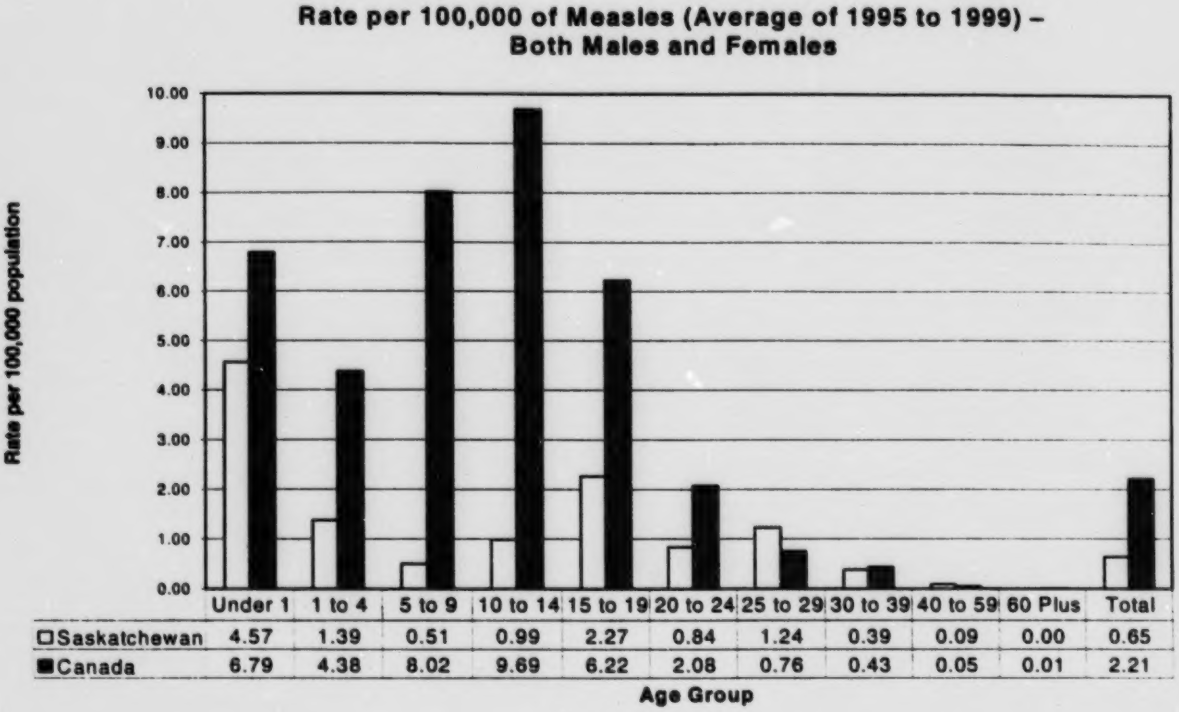
Note: Data for 2001 are preliminary and subject to change.

Sex and Age

A rate per 100,000 by age group has been calculated using an average of data from 1995 to 1999 (with 1997 populations as the denominator) in an attempt to partially address the problem of spikes in the data due to periodic outbreaks of measles and relatively low numbers. This disease is more common among children and young adults than among older adults. Among the general Canadian population, the highest rate is shown in the 10 to 14 age group, followed by the 5 to 9 age group and the under one year olds.

In Saskatchewan, the highest rate is shown in the less than one age group, followed by the 15 to 19 and the 1 to 4 ages groups. It should be noted that the total number of cases in Saskatchewan over this time period is very small (1 in 1995, 8 in 1996, 23 in 1997, 1 in 1998, and 0 in 1999). The corresponding numbers for the whole of Canada are 2,361 in 1995, 335 in 1996, 584 in 1997, 12 in 1998, and 29 in 1999 (Provinces/Territories, NDSS Data base (1980-1997) & Enhanced Surveillance System 1998 to 2001).

Figure 57 Measles: Saskatchewan & Canada by Age



	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40 to 59	60 Plus	Total
☐Saskatchewan	4.57	1.39	0.51	0.99	2.27	0.84	1.24	0.39	0.09	0.00	0.65
■Canada	6.79	4.38	8.02	9.69	6.22	2.08	0.76	0.43	0.05	0.01	2.21

Source: Provinces and territories, Notifiable Disease Reporting System (1980 to 1997), Enhanced Surveillance System (1998 to 2001)

Provincial/territorial comparisons

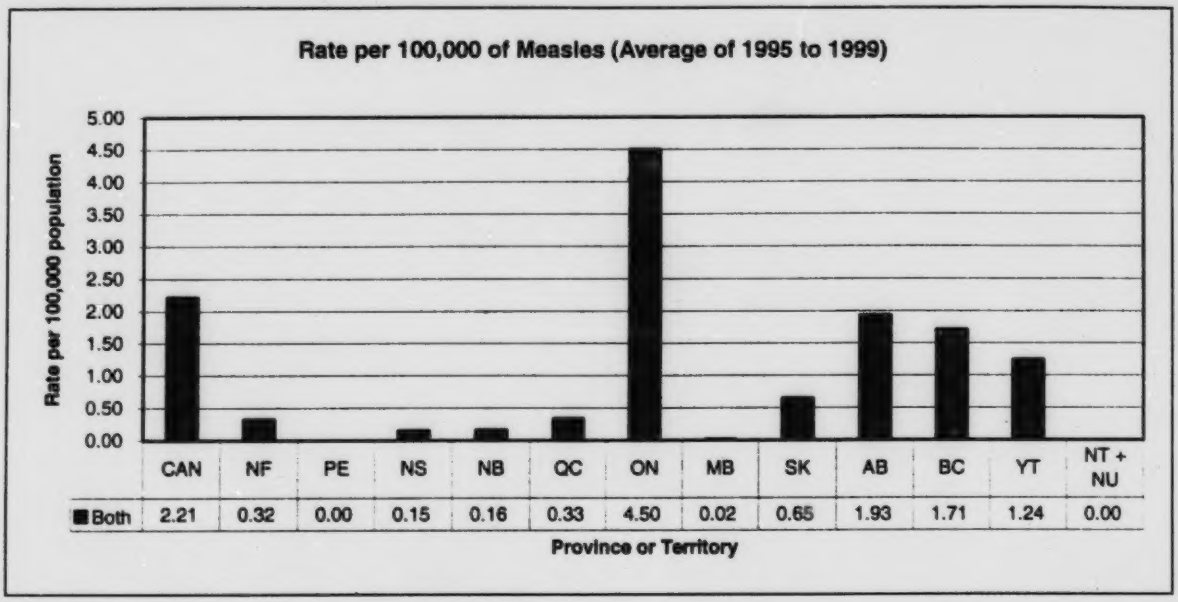
For inter-provincial comparison, an average rate per 100,000 population of reported measles cases has been calculated over 1995 to 1999 using 1997 Statistics Canada population estimates as the denominator. This helps to average out periodic outbreaks in any particular year, part of the nature of the measles disease. There were 33 reported cases in Saskatchewan from 1995 to 1999.

There has been a steady decline in the number of cases of measles in the province, with no reported cases in the last three years being recorded. Although there have been a couple of sporadic outbreaks, Saskatchewan has enjoyed low levels of measles activity for several years as has Canada as a whole.

Saskatchewan started its second dose immunization program in the fall of 1996. This second dose is administered to all children, prior to their entry to school. Supplementary catch-up programs were also introduced in the province in the same year aimed at grade 6 and 8 students. The successful implementation of two-dose vaccination campaigns, and catch-up programs limits the risk of an outbreak in the population of the province, providing 99%

protection to those who receive immunization, and is a step towards the ultimate goal of eradicating measles both nationally and internationally.

Figure 58 Measles: Provincial Comparison



Source: Provinces and territories, Notifiable Disease Reporting System (1980 to 1997), Enhanced Surveillance System (1998 to 2001)

Despite this apparent relative success in reducing the risk of contracting measles at the provincial and national level, surveillance remains extremely important. Several evaluation and surveillance activities related to the catch-up campaigns have been implemented nationally. Amongst other activities, these include surveillance of current rates of measles, monitoring of adverse events associated with vaccination, evaluating the coverage of target achievements, and assessment of the process and cost of implemented immunization and catch-up campaigns [119].

International Comparisons

Data from the OECD is available which reports on the percentage of children immunized against measles on an international basis. Vaccination rates for measles, although related to incidence rates, are not the indicator of interest. Estimates are also available from the USA Centre for Disease Control and Prevention; however, disease rates are based on the total population and not the age groups of interest. Furthermore, there is also some indication that there are limitations with respect to population coverage associated with theses estimates (OECD Report, 2001). Therefore, international data comparisons are not presented here. There is some documentation in the literature as to the status of measles in Canada.

(b) Haemophilus Influenzae b (Hib)

The first Hib vaccines were found to be effective in children older than 2 years of age, but the immune response in children younger than 18–24 months of age (the highest risk group for the disease) was poor [120]. This lack of efficacy in young children (who constitute the majority of potential victims of the disease) was thought to be due to the fact that children younger than 2 years of age lack the maturity in their immune systems required for such a response [121]. Although most provinces implemented universal vaccination programs in 1988-89, the vaccine efficacy rate was only around 74% to 88% in the target age group[122]. The problem of low immunological protection in younger children associated with unconjugated vaccines was overcome by the development of newer, conjugated vaccines. These more effective conjugate vaccines were introduced into immunization programs throughout Canada in 1992.

The continued surveillance of Hib infection rates, therefore, remains an important indicator of the success of immunization programs designed to eradicate invasive Hib from the population, especially in children.

For the purposes of this section we will focus on the number of new cases reported by year in children under 5. [See Appendix A]

Limitations

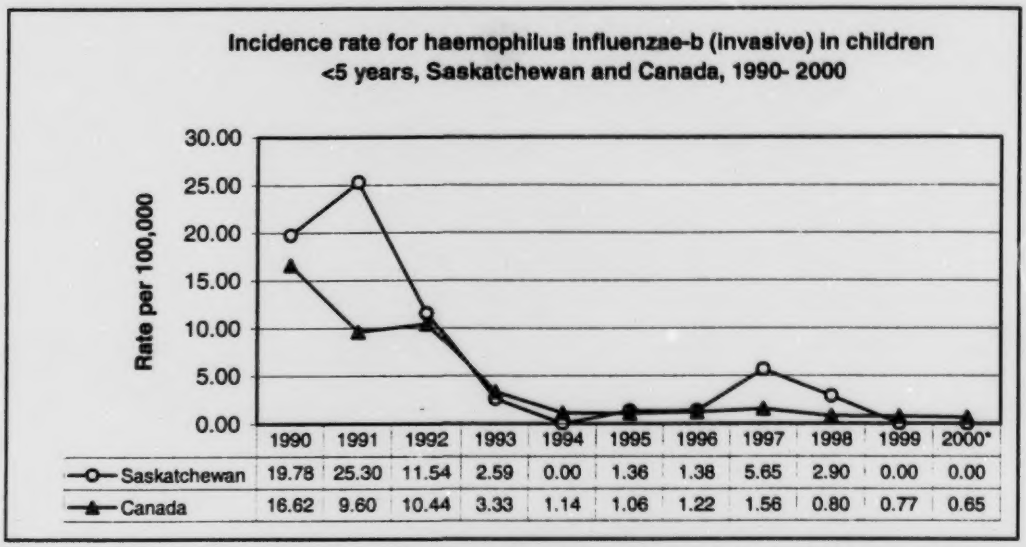
Haemophilus influenzae b (invasive) (Hib) disease was the most common cause of bacterial meningitis and a leading cause of other serious invasive infections in children prior to the introduction of Hib vaccines. Related health consequences of contracting the virus are serious, with 3-6% of cases being fatal, and a further 20% of surviving patients suffering long-term neurological damage, such as hearing loss [123]. The most effective means of controlling Hib disease is through immunization of all young infants. Since the introduction of Hib conjugate vaccines, incidence rates have been declining, but case reporting of the disease is still essential in children aged 5 or under, in whom the chances of infection remain highest.

Trend

Incidence rate for haemophilus influenzae-b (invasive) in Saskatchewan children younger than five years of age fluctuated during the 1990- 2000 period. The incidence rate has declined in Saskatchewan from a high of 25.3 per 100,000 in 1991 to 0 cases per 100,000 in 2000. This decline has been relatively stable, only increasing slightly in 1997 to 5.65 per 100,000 before continuing to decrease again back to the observed rate of 0 per 100, 000 in 2000.

Generally, the national trend showed a similar decline in the incidence rate from 16.62 cases per 100,000 in 1990 to 0.65 cases per 100,000 in 2000. After rapidly declining between 1990 and 1994, the national incidence rate appeared to level off, remaining at comparable low levels to the 1.14 per 100, 000 rate recorded in 1994.

Figure 59 HIB: Saskatchewan Trend, 1990-2000



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000*
—○— Saskatchewan	19.78	25.30	11.54	2.59	0.00	1.36	1.38	5.65	2.90	0.00	0.00
—▲— Canada	16.62	9.60	10.44	3.33	1.14	1.06	1.22	1.56	0.80	0.77	0.65

Source: Notifiable Disease Reporting and Enhanced Surveillance System & Centre for Communicable Disease, Saskatchewan Health.

Note: Rates for Saskatchewan are calculated from the incidence of Hib in children under 5 that is entered in the province's Centre for Communicable Diseases database, and not from the data provided by Statistics Canada. Provincial level data is cleaner (greater assurance is provided that the estimates given represent just type B cases and not all haemophilus influenzae), and more complete (covers the data period after which data are sent to Statistics Canada) than the estimates sent to Statistic Canada, and that appear in the provincial comparison data provided online.
*Data for 2000 are provisional.

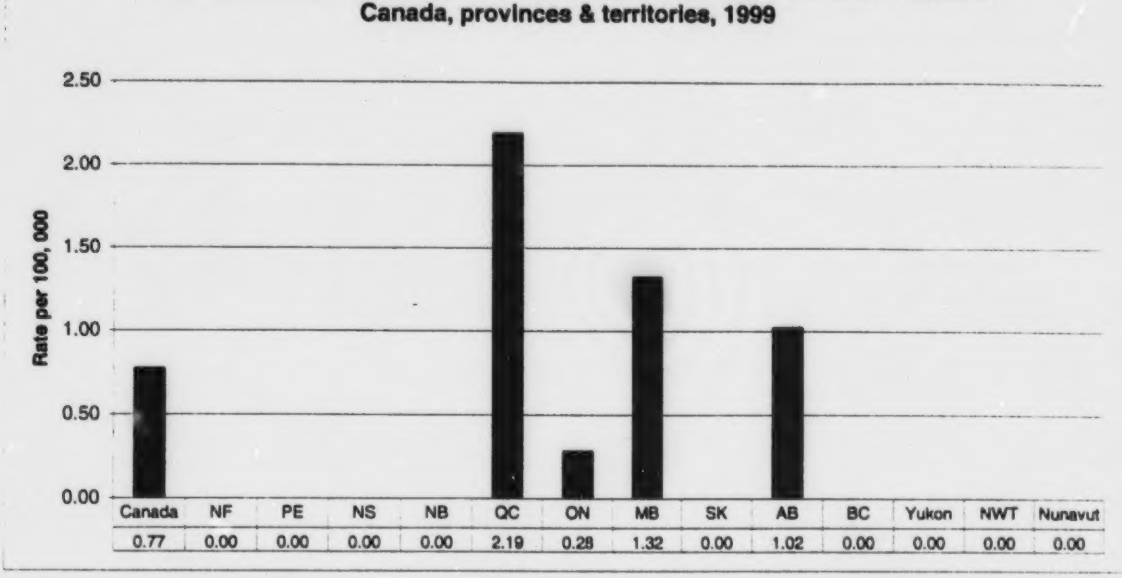
Decreases in the incidence of Hib infection were noted during the period in which the conjugate virus program was introduced (1988-1992), with the largest decline occurring between 1992 and 1993, following the introduction of infant-based Hib vaccination programs province wide [124].

A continuing trend towards decreasing incidence of Hib infection continues to be observed nationally, although there is some inter-provincial variation in the overall rates. Although widespread vaccination using conjugate vaccines has reduced Hib colonisation rates among young children, circulation of the bacteria continues.

Provincial/territorial comparisons

Data are presented from the most recent year (1999) for which estimates could be provided that were not preliminary in nature. As noted below, more recent estimates can be viewed in Appendix C (Figure XII) with the caution that these are preliminary and subject to change. The national average incidence rate was higher than the Saskatchewan estimates.

Figure 60 HIB: Provincial Comparison, 1999



Source: Notifiable Disease Reporting and Enhanced Surveillance System. Saskatchewan Data from Saskatchewan Health Communicable Diseases Centre.

Note: Data for 1999 are presented, as data from more recent years are preliminary. Estimates from 2001 can be viewed in Appendix C – Figure XII, and are provisional.

The socio-economic factors that predispose aboriginal peoples to several health inequalities and put them at risk for a variety of lifestyle related diseases increases the risk of invasive Hib disease[125]. Social conditions, such as overcrowding, poor access to health services, including immunization programs, which promote earlier and repeated exposures to *H. influenzae* and other infections may lead to prolonged and high carriage rates increasing the risk of invasive disease. Cultural factors may also play a role in perceptions about immunization, which may serve to increase the opportunity for Hib infection in vulnerable individuals.

Improving immunization rates in the daycare population, and pre-schoolers in general, is one step towards achieving long-term goals of eliminating invasive Hib disease in the < 5 year-age group. Missed vaccination opportunities have tragic outcomes and Hib infection remains a severe and potentially fatal disease in the very young. Educating health care professionals as to the importance of emphasising the immunization of infants against Hib, and ensuring that the vaccine is administered to all that need it also contribute to the eradication of invasive Hib disease from the Canadian population.

(c) Invasive meningococcal

Invasive meningococcal disease (IMD) has been a nationally reportable disease in Canada since 1924 [126]. IMD is a serious bacterial infection, which can invade the tissues or bloodstream of the body, commonly presenting as meningitis, an inflammation of the lining surrounding the brain and spinal cord. Untreated, meningococcal disease can be fatal. Before the 1990s, *Haemophilus influenzae* type b (Hib) was the leading cause of bacterial meningitis, but new vaccines being given to all children as part of their routine immunizations have reduced the occurrence of invasive disease due to *H. influenzae*.

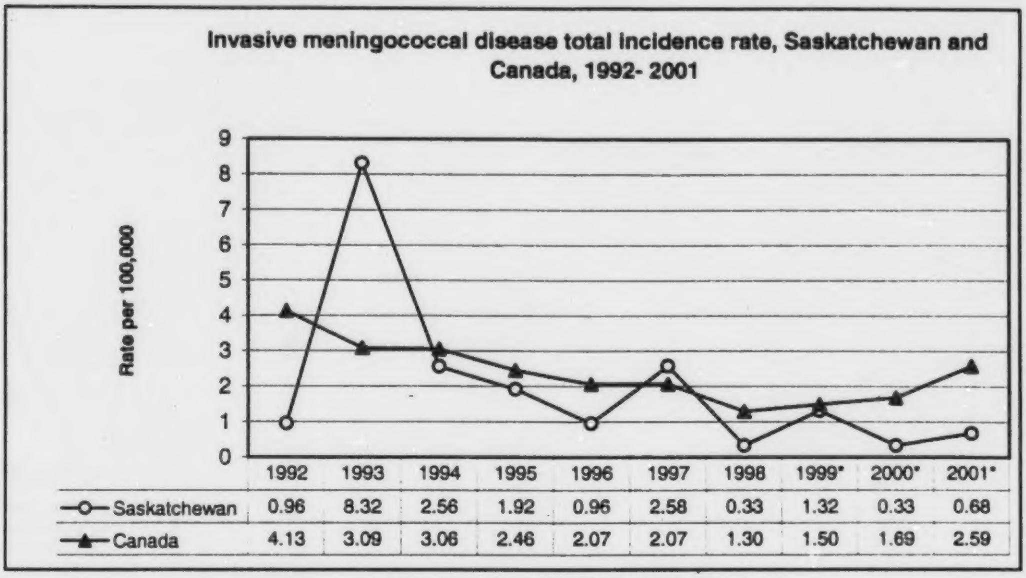
Today, *Streptococcus pneumoniae* and *Neisseria meningitidis* are the leading causes of bacterial meningitis [127]. Although the bacteria that cause the disease can be spread from person to person by direct contact with an infected person's saliva or nasal excretions, around 5 to 10% of the general population will carry the meningococcal bacteria asymptomatically [128]. Very few people, therefore, actually develop the invasive disease despite being carriers, suggesting a role of individual health status in determining the chances of the disease developing into its invasive state. Monitoring the incidence of newly reported cases of invasive meningococcal disease remains an important indirect indicator of health status, but also of the success of preventive immunization programs and their uptake as a means to eradicate the disease on a national basis.

For the purposes of this section we will be looking at the rate of new IMD cases reported by year, age and serogroup. [See Appendix A]

Trend

Between 1992 and 2001, Saskatchewan's total incidence rate for invasive meningococcal disease has undergone a general decrease. Although an outbreak in 1993 caused the rate to rise from 0.96 cases per 100,000 in 1992 to 8.32 cases per 100, 000 in 1993, this steadily decreased again. This decreasing trend was interrupted again in 1997 when 2.58 cases per 100, 000 were recorded, but decreased to an observed low in 2000 of 0.33 cases per 100, 000. This only rose slightly to 0.68 cases per 100, 000 in 2001. It should be noted, however, that the data presented for 1999, 2000 and 2001 is preliminary in nature. Similarly, the national average incidence rate decreased from 4.13 cases per 100,000 in 1992 to 2.59 cases per 100,000 in 2001.

Figure 61 Invasive Meningococcal: Saskatchewan Trend, 1992-2001



	1992	1993	1994	1995	1996	1997	1998	1999*	2000*	2001*
—○— Saskatchewan	0.96	8.32	2.56	1.92	0.96	2.58	0.33	1.32	0.33	0.68
—▲— Canada	4.13	3.09	3.06	2.46	2.07	2.07	1.30	1.50	1.69	2.59

Source: Provincial and Territorial Ministries of Health.

*** Note:** Data for 1999, 2000 and 2001 are preliminary.

Despite the relatively low incidence rates of IMD in recent years, it remains particularly dangerous. This is partly due to the fact that its seemingly random nature reduces public perception about the risk of contracting meningitis, and may lead to a delay in seeking medical care for early symptoms of the disease. Furthermore, the time from onset of minor symptoms to severe meningococcal disease can be relatively short, by which time other organs, including the central nervous system can become infected. Mortality from the disease runs at around one in ten, in addition, approximately one in ten persons who recover will experience some long-term effects such as deafness [134].

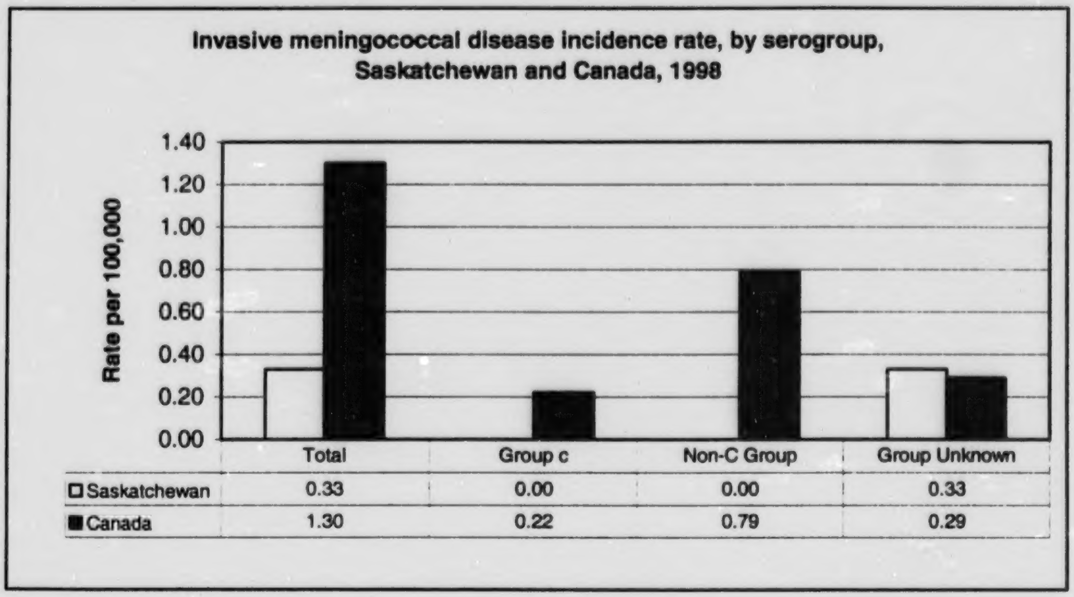
The disease remains particularly difficult to detect in newborns and small infants, where the classic symptoms of fever, headache, and neck stiffness, or presence of a rash may be absent or difficult to ascertain, and the infant may only appear slow or inactive, experience gastric sickness, or have trouble feeding. The highest risk for meningococcal disease is, therefore, among children under one year of age with the next highest risk among teenagers 15 to 19 years of age.

By Serogroup

Serogrouping (a method of subtyping IMD that is used to classify the strain of bacteria responsible for the disease) is important in determining trends and developing policies for control of the disease, especially in the event of an outbreak when serogrouping becomes critical for making appropriate decisions with respects to controlling the spread of the infection. The efficacy of meningococcal vaccination also differs depending on the serogroup for which protection is sought and the age of the person being protected.[129]

Data by serogroup are unavailable for 1999-2001, therefore data are presented for the most recent year currently available, 1998. The national total incidence rate (1.30 cases per 100,000) for invasive meningococcal disease in 1998 was about four times higher than the Saskatchewan incidence rate (0.33 cases per 100,000). Similarly, when considering the incidence rates for invasive meningococcal disease by serogroups, the national averages were higher than the incidence rates for Saskatchewan. For example, Saskatchewan reported no cases per 100,000 of invasive meningococcal disease due to Group C compared with 0.22 cases per 100,000 for the national average. Saskatchewan's last outbreak was in 1993. The public health response was a province wide immunization campaign. While other provinces have had recent outbreaks, Saskatchewan seems to have been spared.

Figure 62 Invasive Meningococcal (by serogroup)



	Total	Group c	Non-C Group	Group Unknown
☐ Saskatchewan	0.33	0.00	0.00	0.33
■ Canada	1.30	0.22	0.79	0.29

Source: Provincial and Territorial Ministries of Health.

IMD – At Risk Groups

The likelihood of contracting IMD not only varies with the prevalence of a particular serogroup in a given population, but a substantial body of research has also indicated that the host's health status and ability to resist disease, rather than bacterial factors, play an important role in determining who becomes ill with meningococcal meningitis. Other than age, with the very young and the elderly being at increased risk, lifestyle factors too can play an important role in the contraction of IMD. The importance of diet and exercise and the avoidance of stress cannot be understated. In addition other factors that impact upon the immune system such as HIV infection and chemotherapy treatment play a role in contracting the disease. Avoiding respiratory illness and tobacco smoke may also help to protect from IMD.

Although casual contact does not increase the risk of contracting IMD, the potential for a heightened risk of IMD in post-secondary students who reside in educational facilities has been highlighted. Although not considered as a risk factor as yet in Canada, first year students residing in university dormitories are often advised to consider meningococcal immunization. Other facilities where residents often eat and sleep together also retain the potential to be at higher risk for IMD outbreaks.

Households with large numbers of people who may share eating and drinking utensils, and other contact points for shared secretions such as toothbrushes, cigarettes, water bottles and straws, also increases the risk of contracting IMD. The same health inequalities that Aboriginal peoples face as a group, and that predisposes them to several other diseases increases the likelihood that lifestyle factors may contribute to their chances of contracting the invasive form of the disease. The prevalence of overcrowding and poor living conditions is higher in this group, as too is the presence of other infectious diseases such as HIV and TB, which can lower immune system functioning. Dietary and exercise patterns, and exposure to tobacco smoke are also factors that can contribute to a heightened risk of IMD in this population. Increased surveillance and the enhancement of immunization programs for certain communities, are perhaps, therefore, warranted.

Immigrants from countries where IMD is pandemic also increase the risk of carrying the virus from one part of the world to another. As such, visitors to these countries should also be advised about the need for immunization prior to visiting such areas.

Provincial/territorial comparisons

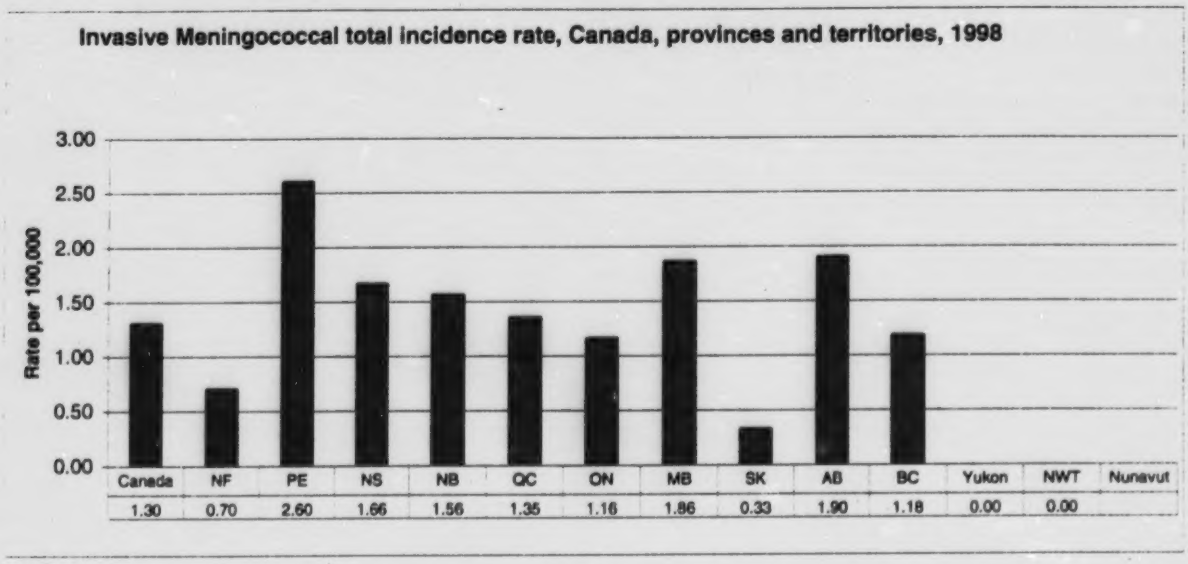
Although data is available for 1999-2001, due to its preliminary nature, provincial estimates are provided for 1998. Data for the most recent year (2001) can be viewed in Appendix C-(Figure VII).

Provincially, Saskatchewan's rate of IMD is the lowest in the country (with the exception of the provinces indicated as being affected by issues surrounding small underlying sample counts), and is substantially lower than the national average. The last outbreak of meningococcal disease in Saskatchewan occurred in 1993, which was ended by a widespread vaccination campaign. As outbreaks tend to recur about every 10-15 years, continued surveillance is needed to ensure that the incidence rate does not exhibit a rise again over time.

Provincial and territorial departments report to Health Canada epidemiological data on all confirmed cases of IMD on a yearly basis. Since 1985 the Laboratory Centre for Disease Control has enhanced surveillance to correlate this information with detailed laboratory studies on serotypes and subtypes of the disease.

Although incidence rates have been declining in recent years in Saskatchewan and Canada in general, there has been some fluctuation in the incidence rates observed since 1993, with serotype C strains of the disease remaining the most prevalent. Seasonal distributions of the disease are often present in data trends (reported elsewhere), with the majority of cases often being recorded in the first few months of the year (January to March) as compared to the warmer months of July to September [130]. This is due to the ease with which the bacteria can spread to people in the winter months as compared to the summer.

Figure 63 Invasive Meningococcal: Provincial Comparison, 1998



Source: Provincial and Territorial Ministries of Health.

Note: The Yukon Territory, the Northwest Territories likely to be affected by small underlying sample sizes therefore caution is warranted in interpretation. Data for Nunavut is not available.

Although the risk of contracting IMD in Canada is very low, even in areas experiencing elevated rates of the disease, continued surveillance is still required. Early identification of suspected cases improves outcomes not just for the individual but also for all individuals in close contact with them. In such cases vaccination is an effective tool in preventing the progression of the benign state of the disease to the full-blown illness. Better education programs for health professionals and the general public, as to the warning signs of IMD infection may serve an important prophylactic role in preventing future IMD outbreaks in Canada.

3.2 Public Surveillance and Protection

For the purposes of this section three examples of public surveillance and protection will be assessed: tuberculosis, influenza reported in people 65 years of age and older, and E.coli. There is considerable variation from infection to diagnoses among the reportable diseases, however, therefore by reporting only the number of positive cases tested and confirmed there is a chance that a number of case go unreported or indeed misdiagnosed. This should be borne in mind when interpreting the estimates presented here.

TB is an important public health problem that has become more prominent in recent years. Incidence is linked to high-risk groups such as recent immigrants, First Nations communities and people co-infected with HIV. Multiple drug resistance is also emerging as a problem.

Effective TB control in Canada, depends substantially on increasing medical and public awareness of this ancient, and now often considered, conquered disease. There has been an increased commitment to eliminating TB at the national level in recent years. At the last G8 summit, in July 2000, the Government of Canada gave assurance that it was endeavouring to reduce TB deaths and prevalence by 50% by the year 2010. Such a plan will involve increased screening and treatment of latent TB, in order to prevent the development of active forms of the disease.

Special attention is also needed to address the role of HIV infection in the proliferation of TB, and on how best to prevent the importation of TB into Canada from countries where the disease is endemic. Education is also crucial on the procedures associated with the treatment of TB infection if the development of MDR-TB (Multiple drug resistant –Tuberculosis) is to be prevented. Deaths have already been reported in Canada from MDR-TB, and these will only continue to rise unless active intervention is undertaken. Of prime importance, is a renewed commitment to addressing the regional and ethnic variations in susceptibility to TB. The increasing rates of TB in certain sub-groups of the population must also be addressed if the TB epidemic is to be controlled at the provincial, national, as well as global level.

Influenza is a common seasonal respiratory condition, affecting large numbers of the population annually. Serious respiratory complications, however, can develop especially in susceptible individuals such as the elderly and those with certain chronic medical conditions. Influenza remains an important cause of morbidity and mortality in Canada [131].

Vaccines against influenza have been available in Canada since the late 1930s (C. Parker, Bureau of Biologics and Radiopharmaceuticals, Health Canada, Ottawa: personal communication, 2000) [132]. Although recommendations about high risk groups who require vaccination is made by the National Advisory Committee on Immunization (NACI), policies for who receives publicly-funded vaccines and program delivery are a provincial or territorial responsibility [138]. Since most influenza-related deaths occur in people over the age of 65 years, all individuals of this age should be considered for influenza vaccination[133].

E. *coli.* bacteria is commonly found in human and animal intestines. Although most strains are harmless, certain strains produce a toxin (verotoxigenic E.*coli*) that can cause serious illness, ranging from diarrhoea and abdominal cramps to death, especially in persons with compromised immune systems - the very young, and the elderly. Haemolytic uremic syndrome (HUS), characterized by renal failure and haemolytic anaemia (a type of anaemia that destroys red blood cells) is also particularly common in the very young, whose bodies cannot tolerate the loss of fluid and blood, and may result in permanent loss of kidney function [134]. In the elderly, HUS, plus two other symptoms, fever and neurological symptoms often co-occur. Mortality rates in the elderly can range as high as 50% [135].

Rates of E. *coli* infection provide some indication of the extent of food-borne illness in the country. Further this indicator also has implications for water-borne disease as well, as E. *coli* from human and animal wastes may be washed into rivers, streams, lakes, or groundwater, and if the water is not treated or inadequately treated E. *coli* may end up in drinking water. Surveillance and careful monitoring programs are vital to ensure the safety of drinking water.

(a) Tuberculosis

TB is a contagious disease, spread through contact with people that have active TB infection. Although TB usually affects the lungs, it can also affect other parts of the body including the brain and spine. A person can become infected with TB bacteria, however, but may not develop the disease. In individuals with healthy immune system functioning, TB germs take up residence in lung cells, but can remain latent for many years. For persons with decreased immune function, whether due to HIV/AIDS infection, poor nutrition, or old age, however, the chances of the disease becoming active are much higher. When infected with both HIV and TB, for example, a person has a one in ten chance of developing active TB each year (compared with a one in ten chance over a lifetime for people without HIV).[136] A person with active pulmonary TB can infect an average of 10 to 15 people per year. Monitoring the incidence of TB in all individuals remains an important tool in attempts to eradicate TB nationally

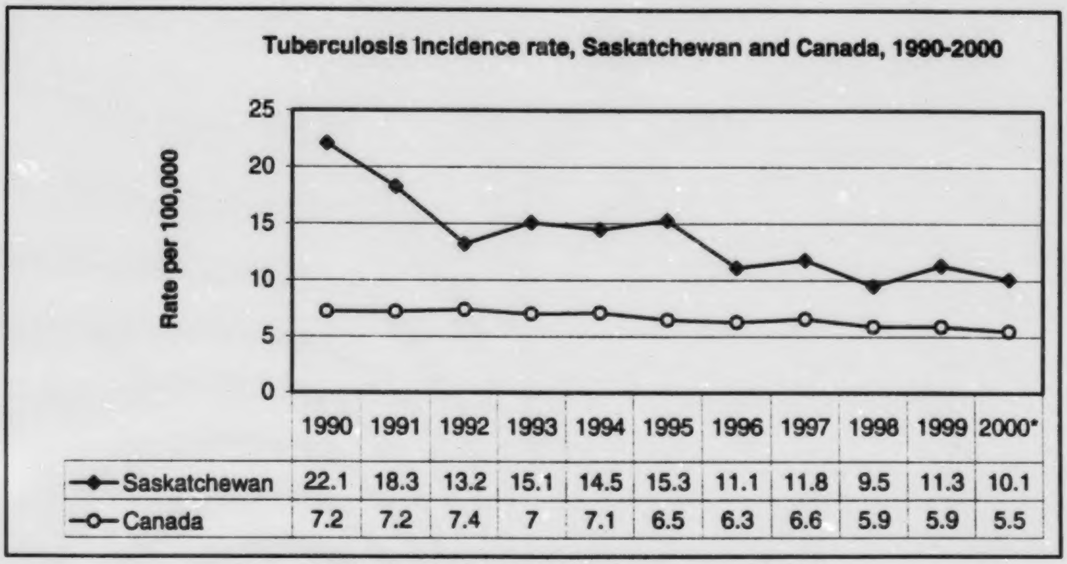
For the purposes of this section we will look at the rate of cases of infectious pulmonary tuberculosis reported by calendar year. [See Appendix A]

Trend

Saskatchewan's rate of incident cases of tuberculosis was higher than the national average for the 1989- 1999 period. In 1989, Saskatchewan's tuberculosis incidence rate was three times (21.1 per 100,000) more than the national average rate (7.4 per 100,000). However, in 1999, the gap between Saskatchewan's tuberculosis incidence rate and the national incidence rate narrowed where Saskatchewan's tuberculosis incidence rate (11.3 per 100,000) was nearly twice the national incidence rate (5.9 per 100,000).

The incidence rates for both Saskatchewan and Canada as a whole declined over the 11-year period. Between 1990 and 2000, Saskatchewan's incidence rate declined from 22.1 per 100,000 in 1990 to 10.1 per 100,000 in 2000. The steepest decline occurred between 1990 and 1992, where the incidence rate dropped to 13.2 per 100,000 in 1992. Similarly, at the national level, the tuberculosis incidence rate decreased from 7.2 per 100,000 in 1990 to 5.5 per 100,000 in 2000.

Figure 64 Tuberculosis: Saskatchewan Trend, 1990-2000



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000*
◆ Saskatchewan	22.1	18.3	13.2	15.1	14.5	15.3	11.1	11.8	9.5	11.3	10.1
○ Canada	7.2	7.2	7.4	7	7.1	6.5	6.3	6.6	5.9	5.9	5.5

Source: Canadian Tuberculosis Reporting System (CTBRS)

***Note**: Date for 2000 are preliminary

In Canada, certain populations are at much greater risk of developing tuberculosis. Aboriginal people (registered and non-registered Indians, Métis, and Inuit), and people who have lived in countries where the tuberculosis rate is high, are particularly susceptible.[137]

The risk of tuberculosis in 1999 was disproportionately higher among Aboriginal people than foreign-born persons living in Saskatchewan than among other Saskatchewan residents. Of the 116 cases reported in Saskatchewan in 1999, at least 87 per cent (or 101 cases) occurred in Canadian-born Aboriginal people. Of the 110 cases reported among Canadian-born persons in Saskatchewan, at least 101 (92 per cent) occurred in Aboriginal people. By comparison, immigrants accounted for 5 per cent (6 cases) of the total tuberculosis cases reported in Saskatchewan in 1999.

Among Canadian-born Aboriginal people in Saskatchewan, the incidence rate of reported tuberculosis in 1999 was 83.3 cases per 100,000 population. Among foreign-born residents of Saskatchewan, the incidence rate was 11.2 cases per 100,000 population. By comparison, among Saskatchewan's non-Aboriginal persons born in Canada, the incidence rate was 11.3 per 100,000 population.

A similar pattern was reported at the national level in 1999. Among Aboriginal Canadians, the incidence rate was 25.1 cases per 100,000 population. By comparison, among non-Aboriginal persons born in Canada, the incidence rate was 2.6 per 100,000 population. Among foreign-born residents of Canada, the incidence rate of reported tuberculosis in 1999 was 20.8 cases per 100,000 population.

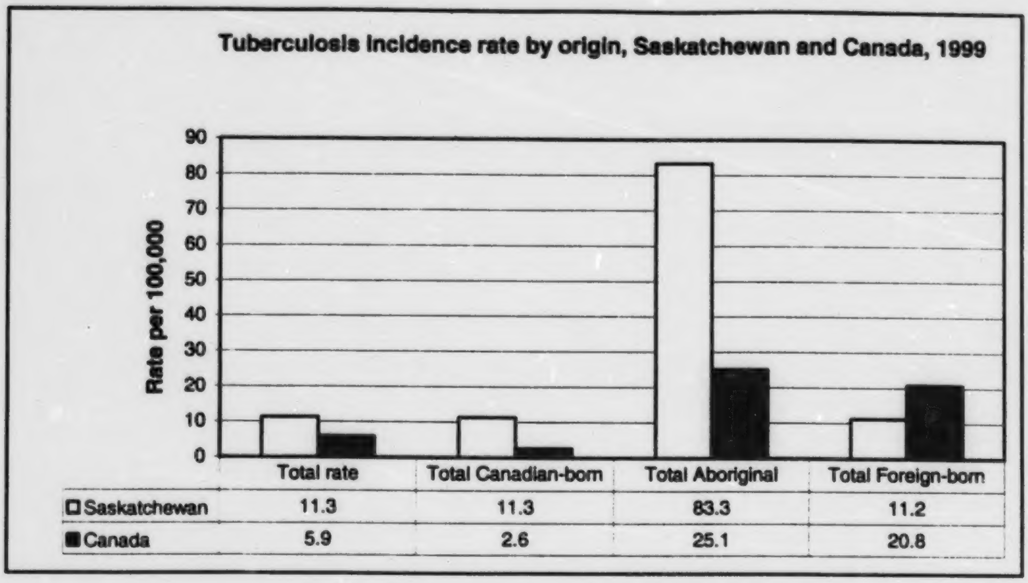
Over and above the risk imposed by foreign-birth, and migration from a country where high rates of TB are evident, certain groups are at an increased risk for this disease. These include disadvantaged inner city residents and other socioeconomically disadvantaged groups. The disproportionate amounts of poverty, homelessness and substance abuse in Aboriginal populations predisposes them to many health-related problems, of which TB is but one.

Another factor is the co-occurrence of diseases that affect immune system functioning. The resistance of HIV positive individuals to infections like TB is lowered. It has been found that where the incidence of AIDS is increasing there is also an increase in the number of TB cases.

Over and above these factors, however, the stage of the epidemic also contributes to the majority of TB cases observed annually in the province.

Medical care involves a long-term course of antibiotics is needed to rid the individual of the infection. Furthermore, the medication must be taken as prescribed, as careless use of the treatment can lead to the development of antibiotic resistant strains of TB emerging. The lack of access to adequate health care may, therefore, contribute to the rates of TB in Aboriginal communities. Prevention and control of TB in aboriginal populations is paramount if the disease is not to run unchecked. Such programs must be culturally sensitive and be placed within the broader context of improving living and social conditions for Aboriginal peoples in general.

Figure 65 Tuberculosis: Incidence by Origin, 1999



	Total rate	Total Canadian-born	Total Aboriginal	Total Foreign-born
□ Saskatchewan	11.3	11.3	83.3	11.2
■ Canada	5.9	2.6	25.1	20.8

Source: Canadian Tuberculosis Reporting System (CTBRS)

Note: Data are presented for 1999 as 2000 data are provisional until publication of the *Tuberculosis in Canada - 2000* Annual Report. Recent estimates from 2000 can be viewed in Appendix C-Figure X

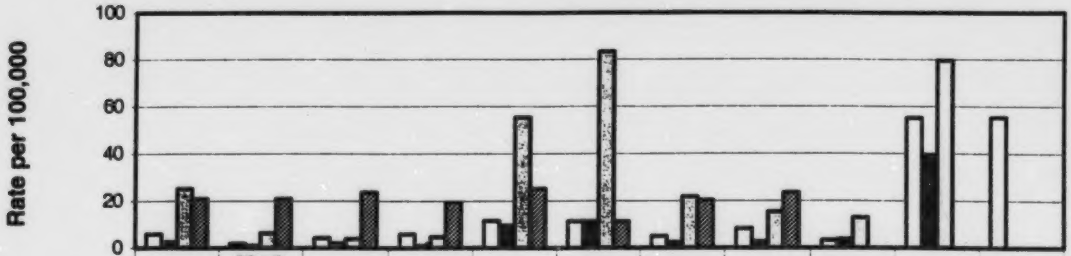
Provincial/territorial comparisons

Data are presented for 1999, as more recent estimates are preliminary. Data from 2000 can be viewed in Appendix C (Figure XI). In 1999, the tuberculosis incidence rates varied considerably across the provinces and territories. Saskatchewan had the fourth highest (11.3 cases per 100,000) tuberculosis incidence rate in 1999.

Of all the provinces and territories, Saskatchewan had the highest (83.3 cases per 100,000) incidence rate of reported tuberculosis among Canadian-born Aboriginal people. Quebec had the lowest (4.0 cases per 100,000) incidence rate among Canadian-born Aboriginal people.

Figure 66 Tuberculosis: Provincial Comparison, 1999

Tuberculosis incidence rate by origin, Canada, provinces and territories, 1999



	Canada	Atlantic Provinces	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
☐ Total rate	5.9	1.9	4.3	5.9	11.5	11.3	5	8.2	3.3	55.2	55.3
■ Total Canadian-born	2.6	1	2	1.1	9.7	11.3	2.4	2.8	3.7	39.5	
☐ Total Aboriginal	25.1	6.4	4	4.8	55.4	83.3	21.8	15.3	13	79.6	
▨ Total Foreign-born	20.8	20.8	23.7	19.3	25.1	11.2	20.4	23.4			

Source: Canadian Tuberculosis Reporting System (CTBRS)

__Notes:__ Data for Nunavut's total Canadian-born and total Aboriginal rates were included in the Northwest Territory data as due to the creation of the new territory in 1999, estimates from Nunavut alone were only available for nine months of the year. This renders the Nunavut data and the NWT data incomparable with other jurisdictions capturing 12 months of the year. Total foreign-born data for Yukon, the Northwest Territories and Nunavut were not available. Data are presented for 1999 as 2000 data are provisional until publication of the *Tuberculosis in Canada - 2000* Annual Report

Although the current overall TB incidence for Canada is quite low compared with other countries, migration patterns are responsible for ending the declining rates of TB in Canada. The vast majority (95%) of immigrants and refugees to Canada come from countries with relatively higher rates of TB[138]. Furthermore, levels of MDR-TB are low in Canada on a province wide basis, only two provinces (Newfoundland and Prince Edward Island) and the territories (Yukon and NWT) have been spared drug-resistant TB, with foreign birth emerging as a significant factor associated with drug resistance [139].

In terms of total TB cases, reported cases of TB are significantly higher in the Prairie Provinces when compared to the rest of Canada. TB rates among Saskatchewan's Aboriginal Peoples are some of the highest in the country.

Saskatchewan, however, has received international attention for its active stance in trying to control TB. Saskatchewan was the first province to conduct mass surveys for TB, and the first to institute a policy of x-ray examination for all residents[140].

Saskatchewan has an active Tuberculosis Control Program. It involves a partnership among many organizations including TB Control at the University of Saskatchewan, Public Health Departments in the health districts, First Nations and Inuit Health Branch of Health Canada and First Nations' organizations.

The program includes a large screening program in high-risk communities across the province, three TB clinics: Saskatoon, Regina and Prince Albert, which are staffed by physician specialists in tuberculosis as well as TB nurses and clerical support. There are over 40 fly-in mobile clinics to remote areas of the province annually, extensive contact screening and patient examination, directly observed therapy and prophylaxis and immunization programs for newborns in high risk communities.

Due to this program many patients are caught very early with the disease at a time when they have no symptoms, before they can transmit the infection and become a public health problem.

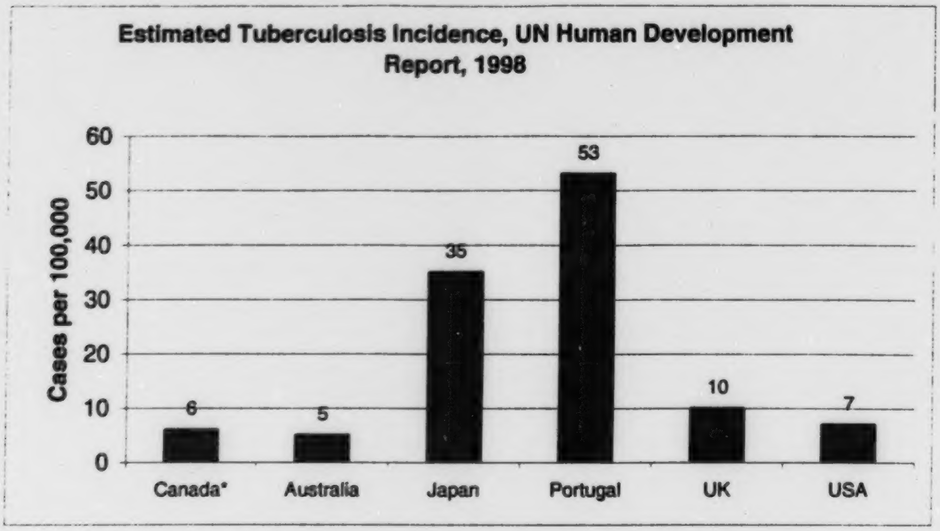
International Comparisons

World-wide, TB is the leading cause of death due to a single infectious agent [141]. After decades of declining rates, the reported incidence of TB in Canada has levelled off since 1987 [142]. The threat of a resurgence of this disease in Canada is increased by the emergence of drug-resistant TB strains. In a recent study by the World Health Organization (WHO) and the International Union Against Tuberculosis and Lung Disease (IUATLD) strains of TB were found to be resistant to first-line anti-TB drugs in all surveyed countries.[143] Furthermore, multiple drug-resistant TB strains (MDR-TB) show evidence of being resistant to second line as well as first-line antibiotics. In the 50 years after the introduction of the first anti-TB drugs, some MDR-TB strains are now completely resistant to all known antibiotics [144]. Increases in population movements around the world due to travel, trade and migration have greatly increased the potential with which drug-resistant TB strains can be imported into Canada.

MDR-TB develops from a combination of practices that result in the inadequate treatment of active TB disease. Deficiencies in programs (e.g. erratic drug supply), physician practices (e.g. inadequate prescribing of antibiotics) and patients' non-compliance with treatment all contributes to the risk of MDR-TB. Certain segments of the population may be at an increased risk of MDR-TB. The same risk factors that predispose individuals to acquire TB in the first place such as poverty, homelessness, and substance abuse, and other high-risk behaviours also serve to increase the chances that MDR-TB will develop.

Data are presented below from the United Nations Human Development Report on estimated TB incidence per 100,000 in 1998. Referral of tuberculosis cases to the World Health Organization may represent only a fraction of the actual number of cases in any one country. Differences between countries are likely to exist in the coverage provided by health services, diagnosis and recording and reporting procedures. However, this is considered to be less of a problem in developed countries; furthermore, data from the United Nations has a high degree of credibility. Most of the data in this report are from 1998, however, Canadian data is from 1996.

Figure 67 Tuberculosis: International Comparison



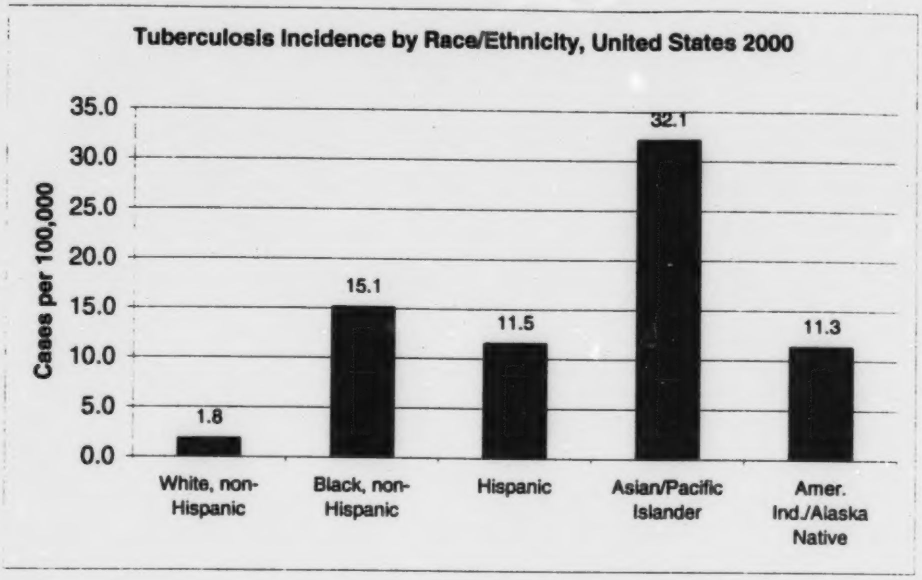
Source: United Nations Human Development Report, 2001

* Canadian estimate is from 1996

As can be seen from the United Nations data presented here, and from the more recent (1999) national estimates of tuberculosis (5.9 cases per 100,000), the incidence of TB in Canada is somewhat lower than it is in other countries. Although the incidence in Australia, the USA and the United Kingdom is not dissimilar that recorded in Canada, they are all substantially lower than the incidence rates reported in Japan (35 cases per 100,000) and Portugal (53 cases per 100,000).
Interpretation of these international comparisons should be done with caution due to differences in definition, diagnosis and reporting procedures between countries. Nevertheless, variations in the incidence of tuberculosis between countries provide some context to the incidence rates of TB within Canada.

One limitation of the UN data, however, is that it does not contain any breakdown by race/ethnic background. Estimates from the United States National Centre for Health Statistics are, therefore, also presented to allow comparisons on the basis of risk factors for the disease to be made.

Figure 68 Tuberculosis (by Ethnicity): International Data



Source: National Centre for Health Statistics (NCHS). National Vital Statistics Report, Vol. 49, No. 3, June 26, 2001.

The incidence rates for TB in the US vary based on ethnic background. The lowest rates are for white, non-Hispanic Americans (1.8 cases per 100,000), which is substantially lower than those recorded for every other ethnic group. This is similar to the pattern of TB incidence recorded in Canada, where more cases are reported in Aboriginal groups (25.1 cases per 100,000) than in Canadian born non-Aboriginal individuals (2.6 cases per 100,000).

These differences may be due to the presence of social and environmental factors that increase the risk of exposure to the disease, and add to the likelihood that the latent version of the disease will become active. Therefore, any factors that suppress immune system function (such as aging, serious illness, drug/alcohol abuse, HIV infection, and diabetes) are all likely to be associated with a higher incidence rate of TB. By virtue of the fact that these risk factors vary substantially according to ethnic background, rates of TB are also expected to vary along similar lines. Indeed, HIV infection is considered responsible for the rising TB trend observed in developed and developing countries.

Furthermore, social conditions can cause the disease to proliferate. Living environments characterised by larger numbers of people living in close proximity, sharing accommodation allow the air-borne infection to infect more individuals, thereby increasing incidence rates in some populations. The likelihood that early detection of TB symptoms will also be identified and acted upon is also likely to vary on the basis of culture.

International differences in the incidence of TB can provide valuable supplemental information on Canadian trends in the prevalence of TB. The breakdown of TB incidence by ethnic group further helps to identify risk factors for the disease that not only exist at the international level, but nationally and provincially as well.

(b) Influenza for 65+

The indicator is based on time of last immunization. Further, individuals aged 65 and over who have not been immunized in the past year are asked why not. Data are available from the CCHS for a subset of the sample, but will allow for estimates at provincial and national levels.

In addition to potentially reducing infection rates, another benefit of immunization programs is that they reduce the prevalence of antimicrobial resistance by reducing the extent of the infection throughout the population and subsequently reducing the number of people being treated with antibiotics [145]. Risks associated with the vaccine are minimal. Influenza vaccination cannot cause influenza, as the vaccine does not contain live virus. Localised swelling at the site of the injection is common but rarely severe enough to interfere with daily activities [146].

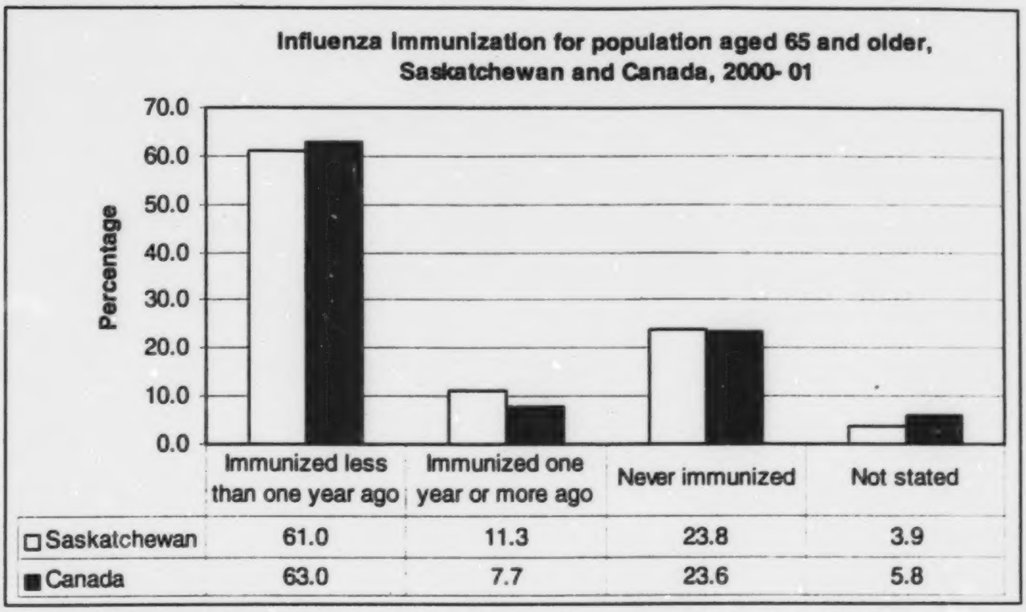
Rates of immunization against influenza in the elderly population can, therefore, provide some indication about preventive measures in place to reduce the burden placed on society by morbidity and mortality rates from infectious diseases.

Trend

Generally, Saskatchewan's influenza immunization percentages for the population aged 65 and older were similar to the national average percentages. In 2000- 01, an estimated 82,705 seniors in Saskatchewan (61.0 per cent of the population aged 65 and older) had an influenza shot within the past year. In contrast, an estimated 32,309 seniors (23.8 per cent) had never had an influenza shot. The remaining population 65 years and older either had received an influenza shot more than one year before or did not report whether they had ever had an influenza shot (Statistics Canada, Canadian Community Health Survey, 2000/01).

Similarly, at the national level, an estimated 2.3 million seniors- 63 per cent of the population 65 years and older- had influenza immunization within the past year. About one million (23.6 per cent) of the population aged 65 and older reported having never had a flu shot within the previous year. Nearly 8 per cent of the population aged 65 and older had received a flu shot more than one year prior to 2000- 01 and almost 6 per cent did not state whether they had ever been immunized against influenza (Statistics Canada, Canadian Community Health Survey, 2000/01).

Figure 69 Influenza Immunization (65+): Saskatchewan & Canada, 2000-01



	Immunized less than one year ago	Immunized one year or more ago	Never immunized	Not stated
□ Saskatchewan	61.0	11.3	23.8	3.9
■ Canada	63.0	7.7	23.6	5.8

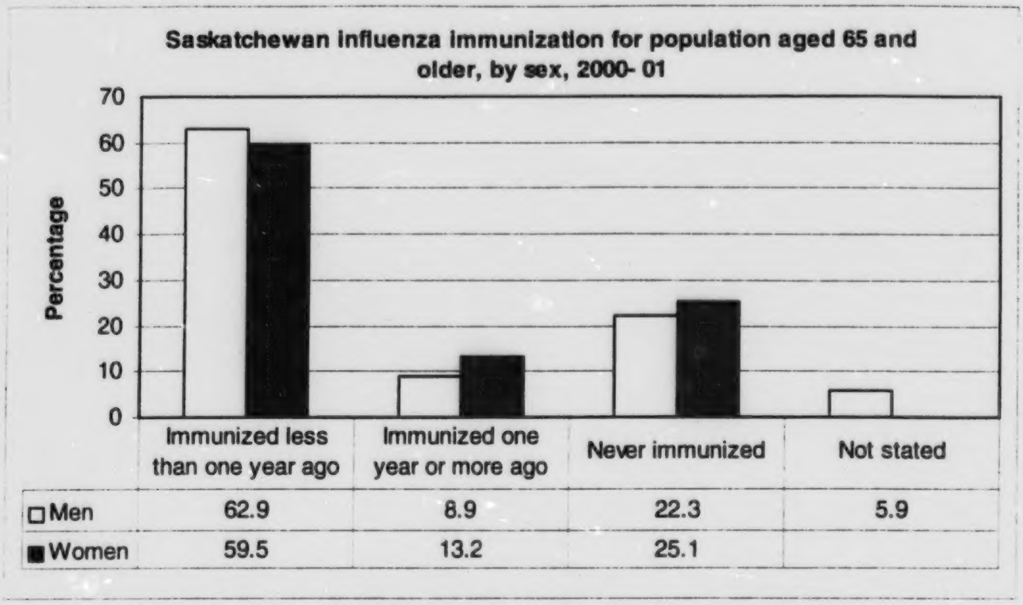
Source: Canadian Community Health Survey (sub sample)– Cycle 1.1, 2000; ISQ

The percentage of Saskatchewan's population who have been recently immunized for influenza is similar to that reported nationally. No apparent differences in gender are present, but there is some indication that an age trend may be present, with higher rates of influenza vaccination being recorded for older individuals (75 years and above) in comparison to those who are between the ages of 65 and 74. These trends represent rates of immunization in the last year. Annual vaccination is recommended due to the potential for the vaccine components to change each year, as well as the fact that immunity declines in the year following immunization

Sex and Age

In 2000- 01, more men (62.9 per cent) in Saskatchewan aged 65 and older reported having had influenza shot within the past year compared with 59.5 per cent of women. On the contrary, more women (13.2 per cent) than men (8.9 per cent) 65 years and older stated having received influenza shot more than one year before. About 25.1 per cent of women aged 65 and older had never been immunized against influenza compared with 22.3 per cent of men.

Figure 70 Influenza Immunization (65+): Saskatchewan Data by Sex, 2000-01



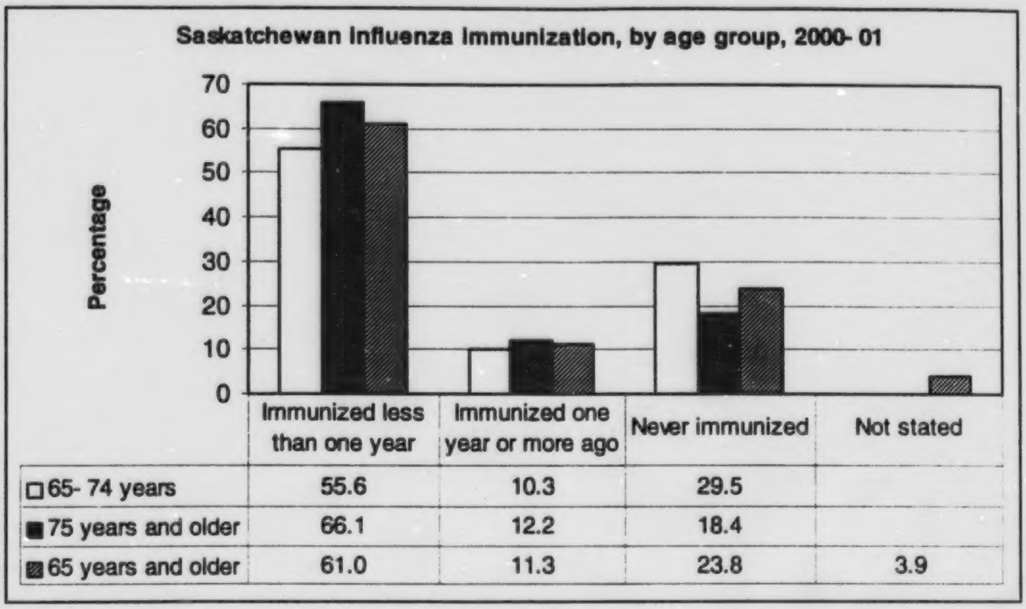
	Immunized less than one year ago	Immunized one year or more ago	Never immunized	Not stated
□ Men	62.9	8.9	22.3	5.9
■ Women	59.5	13.2	25.1	

Source: Canadian Community Health Survey (sub sample)– Cycle 1.1, 2000; ISQ

Notes: Data for women who did not state whether they were immunized against influenza was too unreliable to be published. Estimates for men in all categories except 'immunized less than one year ago' should be interpreted with caution.

In 2000- 01, 66 per cent of Saskatchewan's seniors aged 75 and older had been immunized against influenza within the past year, compared with 56 per cent of seniors aged 65 to 74. In contrast, 30 per cent of the population 65 to 74 years old had never had immunization against influenza compared with 18 per cent of those aged 75 and older.

Figure 71 Influenza Immunization (65+): Saskatchewan Data by Age, 2000-01



	Immunized less than one year	Immunized one year or more ago	Never immunized	Not stated
□ 65- 74 years	55.6	10.3	29.5	
■ 75 years and older	66.1	12.2	18.4	
▨ 65 years and older	61.0	11.3	23.8	3.9

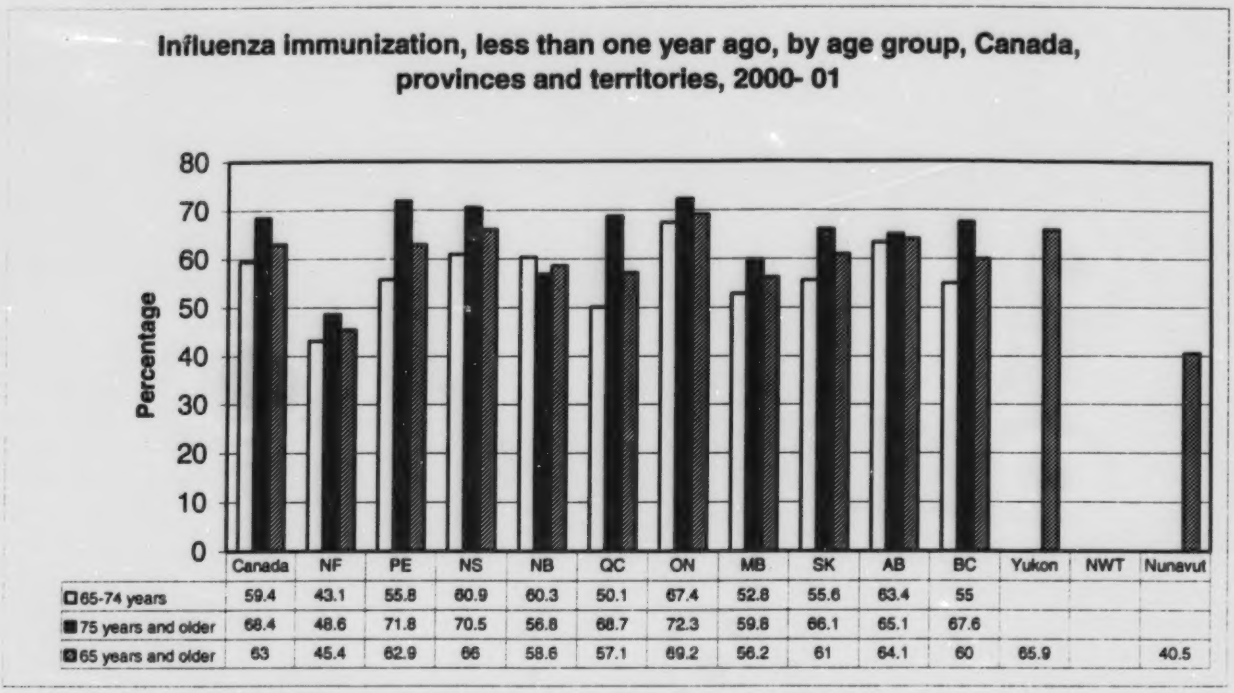
Source: Canadian Community Health Survey (sub sample)– Cycle 1.1, 2000; ISQ

Note: Data for those who did not state whether they were immunized against influenza aged 65- 74 years and 75 years and older were too unreliable to be published. Data for population aged '65 years and older' should be interpreted with caution.

Provincial/territorial comparisons

The percentage of seniors who had received immunization against influenza within the past year varied by province and territory. Saskatchewan was in the middle of the pack with the sixth highest percentage of seniors who had received immunization against influenza within the past year.

Figure 72 Influenza Immunization (65+): Provincial Comparison, 2000-01



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
☐ 65-74 years	59.4	43.1	55.8	60.9	60.3	50.1	67.4	52.8	55.6	63.4	55			
■ 75 years and older	68.4	48.6	71.8	70.5	56.8	68.7	72.3	59.8	66.1	65.1	67.6			
▨ 65 years and older	63	45.4	62.9	66	58.6	57.1	69.2	56.2	61	64.1	60	65.9		40.5

Source: Canadian Community Health Survey (sub sample)– Cycle 1.1, 2000; ISQ

__Note:__ Data for the Northwest Territories and those aged 65- 74 years and 75 years and older in the Yukon Territory and Nunavut were too unreliable to be published.

By the year 2000 eleven provinces and territories had publicly funded influenza immunization programs for persons aged 65 years and older.

It is likely that having immunization policies in place as part of a strategic plan to prevent a pandemic outbreak of influenza has increased awareness of influenza and its prevention through immunization [138]. Differences, therefore, in the promotion of immunization, and physician and public awareness of the need to be vaccinated against influenza may contribute to geographical variations in the uptake of the influenza vaccine.

Immunization remains the most effective and least costly way of preventing influenza outbreaks, and the complications and deaths that can result from serious cases in susceptible individuals. Although there has been a strong focus on immunization programs for children, experts have advocated the usefulness of vaccinating adults too. Although there has been some indication that adult vaccination has not been as successful, or adopted as thoroughly as it has in child vaccination [147], increasing influenza vaccine distribution continues to contribute to a strong national health infrastructure, and improves capacity to deal with potential influenza pandemics in Canada.

(c) E.coli

Since E.*coli* is a natural flora in the gut of humans and animals, bacterium can live in cattle and other domestic animals without causing any symptoms. Cattle appear to be the main source of infection with verotoxigenic E. coli (VTEC), most cases being associated with the consumption of undercooked beef and similar foods, or raw milk[148]. However, other foods have also been implicated. The infection is initially spread via food sources such as undercooked ground beef, unpasteurised milk, cold meats, raw vegetables, cheese and contaminated water, however, after contamination, the infection can be passed from person-to-person, through contact.

The mechanism of transmission in the food chain is not fully understood but the contamination of meat from intestinal contents at slaughter is probably an important factor. Good slaughterhouse hygiene plays a role, as does adequate food preparation practice, such as the cooking of raw meat to destroy bacteria, and the pasteurisation of milk. Hygienic food handling and good chilled storage conditions are essential to ensure that other foods do not become contaminated. Canada takes the additional precaution to inspect slaughterhouses for cleanliness when any type of *E. coli* is found at levels above 100 bacteria per gram of meat [149]

The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination. E. *coli* from human and animal wastes can be washed into streams, lakes, or groundwater by rainfall, snow melts and other types of precipitation. When these waters are used as sources of drinking water and the water is not treated or inadequately treated, *E. coli* can become present in drinking water.

For the purposes of this section we will look at the rate of e.coli cases reported by year. A confirmed case is defined as laboratory confirmation of infection with or without symptoms with isolation of verotoxin producing *Escherichia coli* from an appropriate clinical specimen. [See Appendix A]

Limitations

Provinces/territories update their reportable disease data frequently, even after Health Canada finalizes the data for a given period, so provinces/territories will always have the most up-to-date data for their respective jurisdictions. Furthermore, data is not available by source (e.g. water, food).

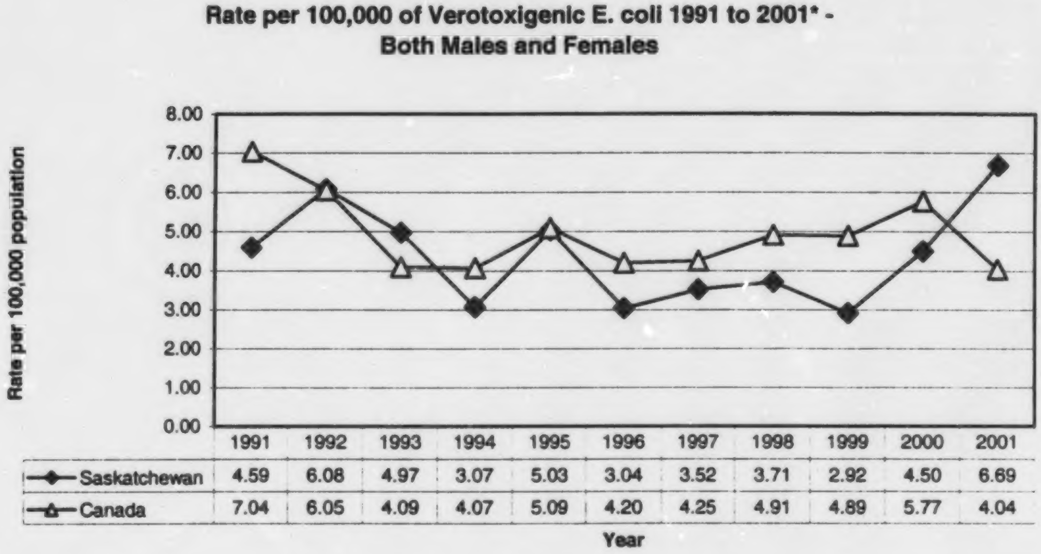
2000 and 2001 Verotoxogenic E. Coli (VTEC) values are preliminary and subject to change.

Trend

The number of reported cases of VTEC each year is small, and therefore there may be significant variation in the rates per 100,000 population from year to year. In order to help put the rates per 100,000 in perspective, the number of reported cases is included in the presentation.

The rate per 100,000 population of reported cases of VTEC for Saskatchewan residents for 1991 to 2001 is generally below that for the general Canadian population with the exception of 2001.

Figure 73 E.Coli: Saskatchewan Trend, 1991-2001



Number of Cases of Verotoxigenic E. coli 1991 to 2001* - Both Males and Females

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000*	2001*
Saskatchewan	46	61	50	31	51	31	36	38	30	46	68
Canada	1,616	1,672	1,173	1,183	1,494	1,247	1,273	1,484	1,490	1,776	1,254

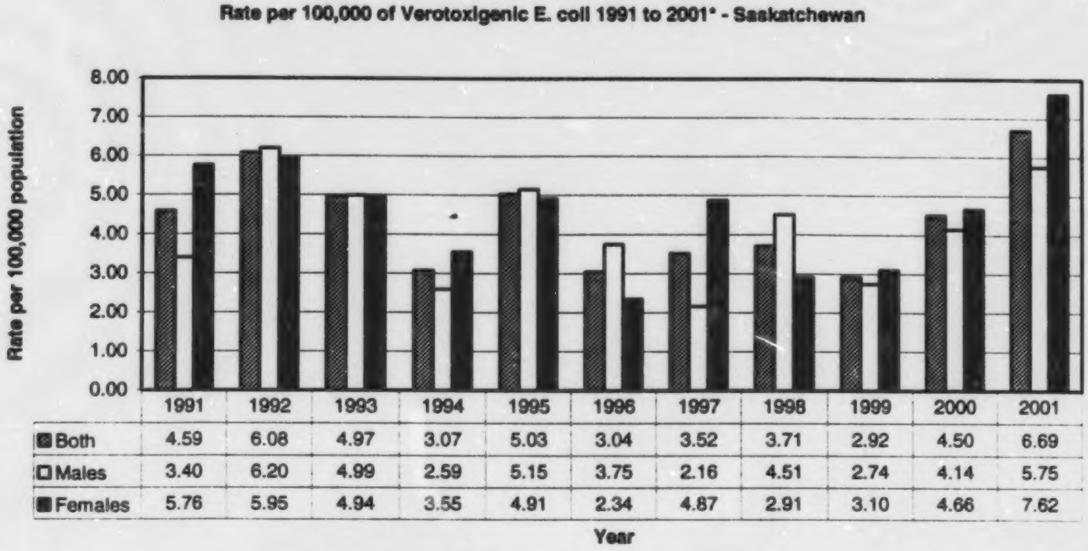
Source: Notifiable Disease records

***Note:** The numbers for 2000 and 2001 are preliminary and subject to change.

Age and Sex

For Saskatchewan residents, from 1991 to 2001, the rates per 100,000 of reported cases of VTEC are higher for males in some years and higher for females in other years. There does not appear to be any trend based on gender.

Figure 74 E.Coli: Saskatchewan Trend by Sex, 1991-2001



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
▨ Both	4.59	6.08	4.97	3.07	5.03	3.04	3.52	3.71	2.92	4.50	6.69
☐ Males	3.40	6.20	4.99	2.59	5.15	3.75	2.16	4.51	2.74	4.14	5.75
■ Females	5.76	5.95	4.94	3.55	4.91	2.34	4.87	2.91	3.10	4.66	7.62

Number of Cases of Verotoxigenic E. coli 1991 to 2001* - Saskatchewan

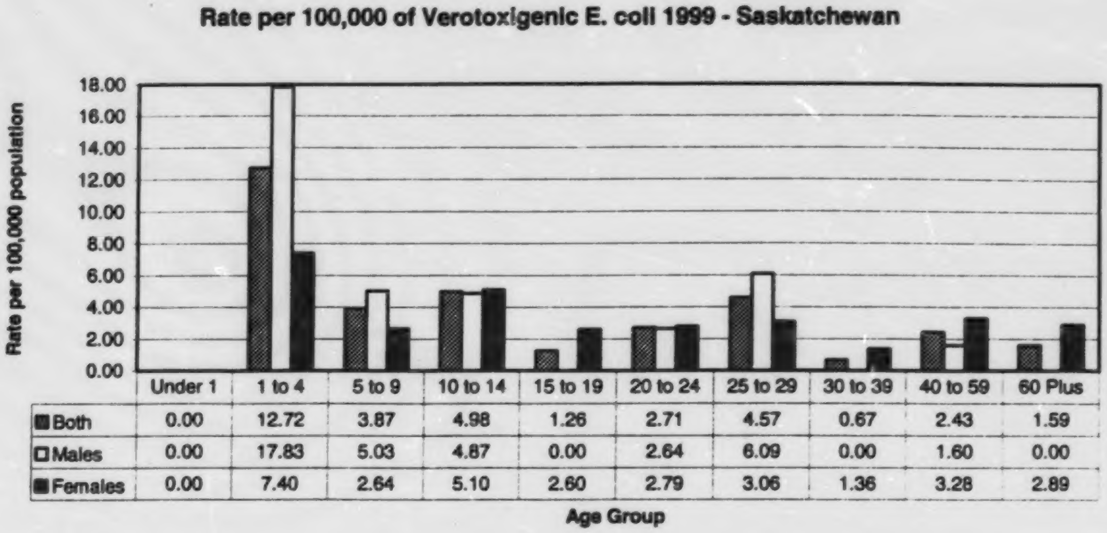
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000*	2001*
Both	46	61	50	31	51	31	36	38	30	46	68
Males	17	31	25	13	26	19	11	23	14	21	29
Females	29	30	25	18	25	12	25	15	16	24	39
Unspecified	0	0	0	0	0	0	0	0	0	1	0

Source: Notifiable Disease records

*** Note**: Data for 2000 & 2001 are preliminary and subject to change.

When the rates are broken down by age group and sex, the very small numbers leads to considerable variation from year to year. The rates of reported cases of VTEC are generally the highest for the 1 to 4 year old age group.

Figure 75 E.Coli: Saskatchewan Data by Age, 1999



	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40 to 59	60 Plus
▨ Both	0.00	12.72	3.87	4.98	1.26	2.71	4.57	0.67	2.43	1.59
☐ Males	0.00	17.83	5.03	4.87	0.00	2.64	6.09	0.00	1.60	0.00
■ Females	0.00	7.40	2.64	5.10	2.60	2.79	3.06	1.36	3.28	2.89

Number of Cases of Verotoxigenic E. coli 1999 - Saskatchewan										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40 to 59	60 Plus
Both	0	7	3	4	1	2	3	1	6	3
Males	0	5	2	2	0	1	2	0	2	0
Females	0	2	1	2	1	1	1	1	4	3
Unspecified	0	0	0	0	0	0	0	0	0	0

Source: Notifiable Disease records

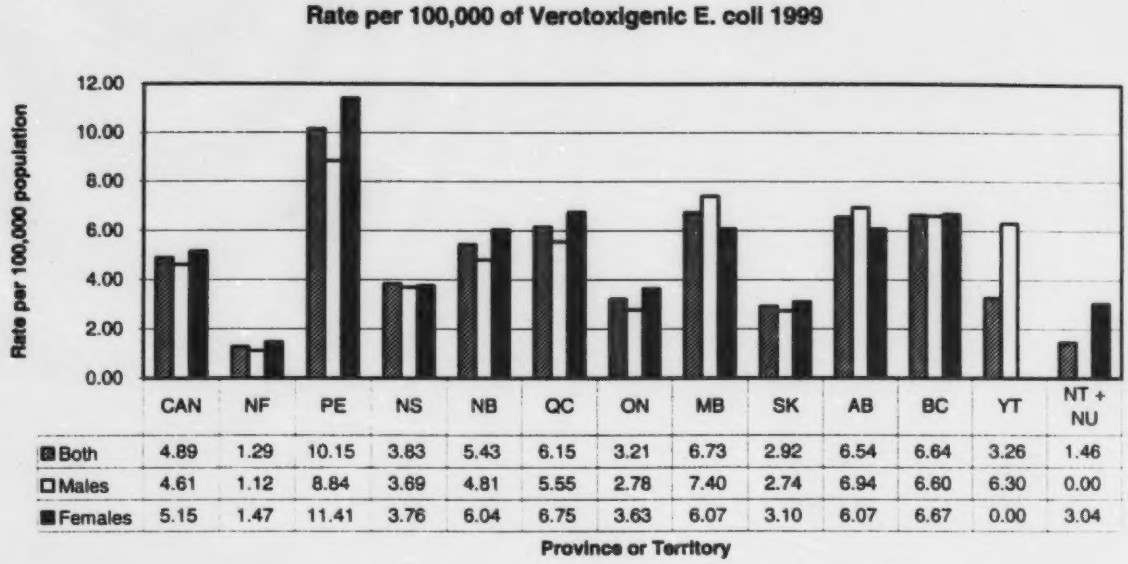
Note: Data are presented for 1999 as estimates for 2000 and 2001 are preliminary and subject to change. Data for the most recent year (2001) can be viewed in Appendix C – Figure XIII

Gender does not appear to contribute significantly to the trends in E.*coli* incidence, however, there does appear to be a large variation in age. The rate of E.*coli* in children aged one through four years is substantially higher than any other age group. E.*coli*, is not a childhood disease, however, anyone can become infected but children are more likely to experience serious complications, and are therefore the most likely cases to be reported. A similar trend is observed for older adults (60+), again older adults are also at risk of serious health consequences as a result of E.*coli* infection, and again this can result in a disproportionate amount of reporting in elderly individuals.

Provincial/territorial comparisons

Saskatchewan residents had the third lowest rate of reported cases of VTEC among all provinces and territories in 1999. Saskatchewan male residents is amongst the lowest for reported cases of VTEC among all provinces and territories in 1999.

Figure 76 E.Coli: Provincial Comparison, 1999



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT + NU
▨ Both	4.89	1.29	10.15	3.83	5.43	6.15	3.21	6.73	2.92	6.54	6.64	3.26	1.46
☐ Males	4.61	1.12	8.84	3.69	4.81	5.55	2.78	7.40	2.74	6.94	6.60	6.30	0.00
■ Females	5.15	1.47	11.41	3.76	6.04	6.75	3.63	6.07	3.10	6.07	6.67	0.00	3.04

Number of Cases of Verotoxigenic E. coli 1999													
	CAN	**NF**	**PE**	**NS**	**NB**	**QC**	**ON**	**MB**	**SK**	**AB**	**BC**	**YT**	**NT + NU**
Both	1,490	7	14	36	41	452	370	77	30	194	267	1	1
Males	696	3	6	17	18	201	158	42	14	104	132	1	0
Females	792	4	8	18	23	251	212	35	16	89	135	0	1
Unspecified	2	0	0	1	0	0	0	0	0	1	0	0	0

Source: Notifiable Disease records

Note: Data is presented for 1999 as estimates for 2000 & 2001 are preliminary and subject to change. Data from the most recent year (2001) can be viewed in Appendix C – Figure XIV. Data for Nunavut was combined with the NWT as estimates were not available for a full year from Nunavut in 1999.

The rates of E.*coli* in Saskatchewan fluctuate from year to year, but have consistently remained at levels lower than those reported nationally. Although the rates presented for 2000 and 2001 are preliminary and likely to change (estimates from the most recent year can be viewed in Appendix C – Figure XIV), there is some suggestion that these have increased in Saskatchewan from 1999 to 2001. This may be due to an increased saliency that E.*coli* has attained in recent years, and that many more doctors are now testing for it than before. The small number of cases that are reported here however, may actually represent only a small percentage of the actual prevalence of food-borne diseases such as E.*coli*. Many people will get ill every year with food poisoning related symptoms, but never attend a doctor. More people reporting their food poisoning symptoms to a medical professional may partially be accounted for, therefore, by the high profile that E.*coli* has attained in recent years.

Areas known for their livestock industry, and that have high density cattle populations, routinely report higher than national-average rates of E. *coli* infection. Links between cattle density and E.*coli* infection have also been found in more recent studies of water quality in rural areas [150].

Different paths of reporting and inter-provincial differences in reporting protocol exist, which suggests that variations between provinces must be interpreted with caution. However, it is likely that intensive farming practices may potentially result in higher rates of E.*coli* infection being experienced in some areas of the country than others.

Rates of E.*coli* incidence at the provincial and national level serve as indicators of how effective current food safety systems in Canada are in preventing and controlling outbreaks of pathogenic food-borne and water-borne infections such as Verotoxogenic *E. coli*.

CHAPTER 4: A STORY ABOUT SELECT DISEASES

The following chapter will look at a select set of diseases including heart attacks (acute myocardial infraction), stroke and a variety of cancers.

First, we will focus on three topic areas associated with heart attacks including mortality rate, 30-day in-hospital mortality rate from acute myocardial infraction and potential years of life lost.

Second, we will focus on three topic areas associated with stroke, including mortality rate, 30-day in-hospital mortality rate from stroke and potential years of life lost.

Finally, we will discuss breast, prostate, colorectal and lung cancer by focusing on four topic areas including; (a) incidence rates, (b) potential years of life lost, (c) mortality rates and (d) five-year relative survival rates.

For the purposes of this report, age-standardized rates are reported which are standardized to the 1991 Canadian population. Age-standardization helps to control for any bias that may be introduced by comparing estimates amongst provinces with different case and age distributions.

Within this report, age-standardized incidence rates will be defined as the number of newly diagnosed primary cancer cases in a given year for specific sites per 100,000 that would have occurred in the standard population if the actual age-specific rates observed in a given population had occurred in the standard population. [See Appendix A]

Age-standardized incidence rates measure the appearance of new cancers. This incidence rate is influenced by two main groups of factors: (1) the underlying rate of cancer incidence, which in turn reflects, in part, the prevalence of risk factors such as smoking, and hence the success of primary prevention efforts, and (2) the rate of detection and diagnosis of cancers, which in turn can be influenced by the intensity and effectiveness of cancer screening programs.

Unfortunately from the viewpoint of interpreting this indicator, these two factors work in opposite directions. For example, an increase in measured cancer incidence could reflect either deterioration in healthy life style or an improvement in screening. However, this latter kind of "screening artifact" is unlikely to carry on for a long period of time so that generally, a declining incidence of cancer suggests a positive change in population health. This interpretation issue is being addressed by the addition of staging data to the cancer registry systems. Cancer staging provides information on how advanced (serious) the cancer is at the time of diagnosis.

The quality of health during the remaining years is also crucial. Aggregated measures of health such as PYLL and DFLE help to address this issue.

For the purposes of this report potential years of life lost will be defined as the number of years of life "lost" when a person dies "prematurely" from any cause – defined as dying before age 75. [See Appendix A]

The most widely used indicator based on mortality rates is life expectancy. It measures *average* expectation of life, and therefore reflects both changing lengths of life for the very old, and changes in mortality rates for the non-elderly. PYLL is a complementary indicator focusing on mortality among the non-elderly. It reflects the level of success in preventing premature (and therefore presumably preventable or postponable) loss of life, with its consequent loss of social and economic productivity. It is an overall indicator of population health and well-being, and effectiveness of preventive programs.

It should be noted that, at old ages, co-morbidity becomes very frequent and cause of death is often the result of several conditions. This can make PYLL more meaningful for diseases that can be identified as the sole cause of death and for those that kill at an early age. Unfortunately, PYLL is only based on single causes of death statistics.

For the purposes of this report mortality rates will be defined as the number of deaths of individuals where the underlying cause of death is one of the specified conditions, per 100,000 population, that would have occurred in the standard population if the actual age-specific rates observed in a given population had occurred in the standard population. [See Appendix A].

Age-standardized cancer death rate trends may indicate long-term success in reducing deaths from these diseases, compared with other provinces and countries. Lower death rates indicate success in cancer prevention, detection, and treatment.

For the purposes of this report relative survival rates will be defined as the ratio of the observed survival of cancer patients five years after diagnosis, over the survival that would have been expected had they been subject only to the mortality rates of the general population similar in characteristics such as age, sex, and geographic place of residence.

Relative survival is the most widely used method for analysing the survival of cancer patients in population studies. It reflects the added likelihood of mortality of those diagnosed with cancer.

The relative survival rate is influenced by two distinct groups of factors: (1) the severity (stage) of the cancer at the time of diagnosis, and (2) the effectiveness of cancer treatment after diagnosis. While the indicator does not shed light on the relative importance of these two kinds of factors, from the viewpoint of interpreting this indicator, these two factors work in the same direction. For example, an improvement in screening would result in cancers being detected at an earlier stage, where treatments are generally more successful, resulting in better observed survival. And if there had not been a significant change in screening, better observed survival would indicate more effective and successful cancer treatment after diagnosis. This interpretation issue is currently being addressed by the addition of staging data to the cancer registry systems. Cancer staging data indicates how advanced (serious) the cancer is at the time of diagnosis.

Prostate, breast, lung and colorectal cancer are reported on because they represent the four most common cancer sites. In particular, lung cancer relative survival rates are reported to inform the public of the poor prognosis of this cancer. The fact that health system interventions with lung cancer are not very successful underscores the need to emphasize preventive strategies.

In general, although incidence rates for colorectal cancer appear to have changed little in Saskatchewan in the last twenty years, there is considerable evidence of a trend towards decreasing mortality rates and PYLL in the province, as well as signs of a favourable five year relative survival rate being present.

This indicates improvements in the province in terms of the early detection and treatment of colorectal cancer, and possibly changes in the exposure to risk factors for the disease. Changes in dietary habits (reduction in total fat intakes, and meat products), as well as increases in physical activity are all positive behavioural changes that have occurred in recent years, and concomitantly contributed to the changing face of colorectal cancer in the province.

Since age is the most predictive factor for the development of colorectal cancer, incidence being higher after the age of 70, the ageing of Saskatchewan's population over the next twenty years is likely to have a profound effect on the number of cases diagnosed, and as such increase the need for detection and treatment procedures to be in place.

4.1 Heart Attack

A report by the Saskatchewan's Health Services Utilization and Research Commission (1995) [151] indicated that heart disease is the leading cause of death in Canada. Ischemic heart disease (IHD) accounts for the greatest percentage of deaths at 21%, of which half are due to acute myocardial infarction (AMI) or better known as a heart attack.

For the purposes of this section we will look at: (a) the Age-standardized mortality rates of acute myocardial infarction (AMI), (b) the risk adjusted rate of all cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of Acute Myocardial Infarction (AMI) and (c) potential years of life lost.
[See Appendix A]

(a) Mortality rate

Since death from IHD may occur suddenly in the absence of, or within one hour of the onset of symptoms [152] the need for effective disease prevention and pre-hospital care is evident. Results from the Quebec Cardiovascular Study highlight this fact, suggesting that 60% of deaths from ischemic heart disease occurred as a first event and that for 42% of all men, death was within one hour of the onset of their symptoms [153].

In terms of disease prevention, lifestyle and family history (genetic predisposition) are the two main factors linked to the development of heart disease. As genetic predisposition to heart disease cannot be modified, lifestyle remains the most important modifiable risk factor in terms of preventing death from AMI. As such, AMI mortality rates, and 30-day in-hospital mortality rates, remain significant indicators of success in the prevention of and early intervention into a disease that continues to place a considerable social and economic burden on the Canadian population.

Limitations

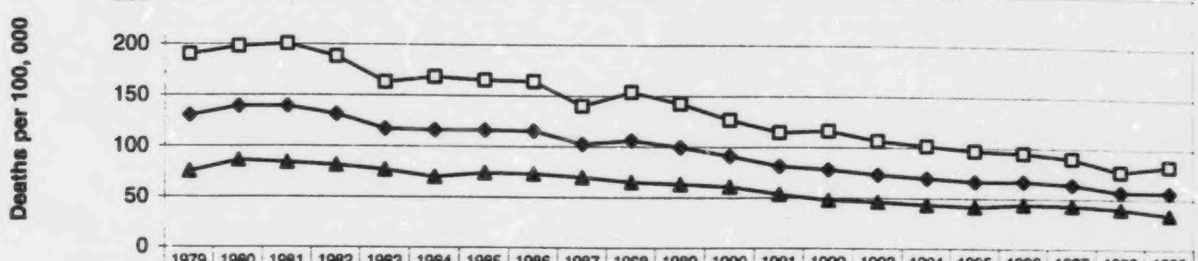
From 1979 to 1999, the underlying cause of death was coded using the International Classification of Diseases, 9th Revision (ICD-9); beginning with 2000, the underlying cause of death will be coded using ICD-10, thus introducing discontinuity to the trend data.

Trend

The AMI mortality rate decreased in Saskatchewan between 1979 and 1999. The rate of deaths in 1999 (56.4 deaths / 100,000) was less than half the rate reported in 1979 (130.5 deaths / 100,000) for the total population. Similar trends were present for both males and females in the same time period.

Male mortality rates for AMI remained consistently higher than those for females throughout the twenty year time period, but decreased over time from a high of 200.6 deaths per 100,000 in 1981, to a low of 83.0 deaths per 100, 000 in 1999. For females in Saskatchewan, the highest rate of death from AMI was recorded in 1980 (86.3 deaths per 100, 000), declining to 34.1 deaths per 100,000 in 1999.

Figure 77 AMI Mortality: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both	130.5	139.2	139.2	131.5	117.2	116.2	116.1	115.5	102.6	106.2	99.6	91.4	81.6	78.5	73.4	69.8	66.8	67.1	64.2	56.8	56.4
—□— Male	190.4	197.9	200.6	188.4	163.0	168.6	165.2	164.1	140.4	154.1	142.7	127.1	114.7	116.6	106.6	101.6	97.2	95.1	90.0	76.9	83.0
—▲— Female	75.4	86.3	84.1	81.5	76.9	70.3	74.2	73.4	69.8	65.4	63.4	61.2	53.8	47.9	46.6	43.8	41.7	44.0	43.3	40.0	34.1

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

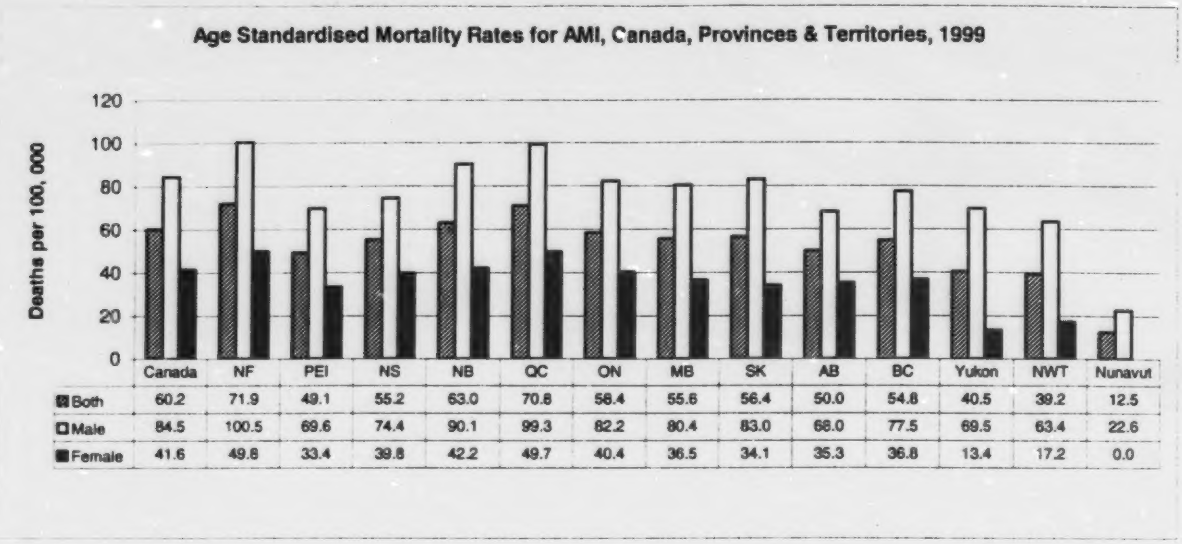
Mortality rates are likely to be affected by changes to the clinical management of early warning signs, and further treatment. An important recent change has been a shift in the primary responsibility of the acute phase of treatment, for patients presenting early with problems symptomatic of cardiovascular complications, from the cardiologist and cardiac care unit to the emergency physician and nurse [154]. Prompt intervention has the potential to contribute to lower rates of mortality for AMI, and may in part have some bearing on the relative decline in mortality observed over recent years.

Provincial/territorial comparisons

The age standardized mortality rate from AMI for the general population of Saskatchewan was 56.4 deaths per 100, 000 in 1999. This rate falls slightly below the national average (60.2 deaths per 100, 000). The lowest rates are recorded for the Territories; however small sample sizes may be responsible for the observed data trends.

Prince Edward Island reported the lowest mortality rate for AMI in the general population in 1999 (49.1 deaths per 100, 000), closely followed by Alberta (50.0 deaths per 100,000). In general female rates of mortality due to AMI remained consistently below those for males (84.5 deaths per 100,000 for males compared to 41.6 deaths per 100, 000 in females). The lowest reported provincial rates were found for males in Alberta (68.0 deaths per 100,000), and women in Prince Edward Island (33.4 deaths per 100,000), closely followed by Saskatchewan where the recorded female mortality rate due to AMI was 34.1 deaths per 100,000. Men in Saskatchewan had the 4th highest (83.0 deaths per 100,000) mortality rate from AMI.

Figure 78 AMI Mortality: Provincial Comparison, 1999



	Canada	NF	PEI	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	60.2	71.9	49.1	55.2	63.0	70.8	58.4	55.6	56.4	50.0	54.8	40.5	39.2	12.5
☐ Male	84.5	100.5	69.6	74.4	90.1	99.3	82.2	80.4	83.0	68.0	77.5	69.5	63.4	22.6
■ Female	41.6	49.8	33.4	39.8	42.2	49.7	40.4	36.5	34.1	35.3	36.8	13.4	17.2	0.0

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Note: Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to small sample sizes.

Within Saskatchewan, there has been a great deal of research on a variety of cardiovascular disease related projects. Funding provided by the Heart and Stroke Foundation of Saskatchewan in 2001 to researchers at the University of Saskatchewan has contributed to the development of research projects in a variety of areas. These have ranged from reducing risk factors to safer surgery techniques. The fundamental goals are to seek better prevention and treatment regimes, which ultimately have the potential to lessen the impact that mortality due to heart disease places on the population. Declining rates of death due to AMI in recent years may be attributable to these advances at the provincial, and national level.

International Comparison

International comparisons should be interpreted with caution, as differences exist in the accuracy and reporting requirements of deaths.

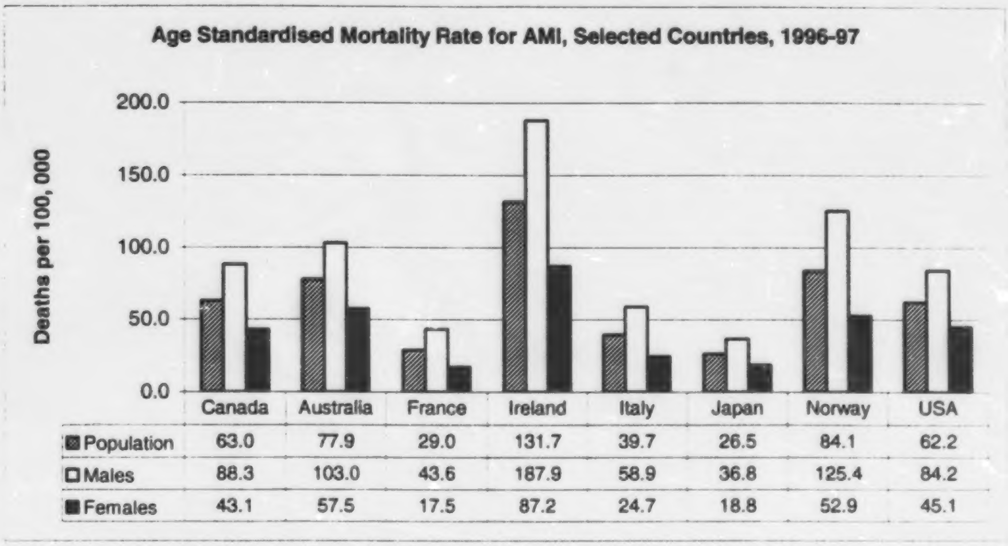
As the OECD Health Data 2001 report provides the most complete, contemporary information, and is standardized against a population that is similar to the Canadian standard population that report 's information is used to provide the international comparisons.

Estimated mortality rates are based on the number of deaths according to sex and selected causes as provided by the World Health Organization. The age standardized death rates per 100, 000 of the population are calculated by the OECD secretariat.

The age standardized mortality rates are a useful benchmark from which Canadian data can be evaluated with reference to international standards, as they control for the differences in the age structure of the population.

The estimates presented below represent the most recent year of data available for selected countries. Only those countries that had data from a similar time period as that for which Canadian data were available (1997) are presented from the total listing of all 23 OECD countries. Data from other years were included if they represented either the highest or lowest mortality rates of the international data set.

Figure 79 AMI Mortality: International Comparison



	Canada	Australia	France	Ireland	Italy	Japan	Norway	USA
▨ Population	63.0	77.9	29.0	131.7	39.7	26.5	84.1	62.2
☐ Males	88.3	103.0	43.6	187.9	58.9	36.8	125.4	84.2
■ Females	43.1	57.5	17.5	87.2	24.7	18.8	52.9	45.1

Source: Organization for Economic Cooperation and Development

The mortality rate for AMI for the general population of Canada is similar to mortality rates found in the United States (63.0 and 62.2 deaths per 100,000 respectively). In comparison, Ireland had a high mortality rate for AMI in the general population (131.7 deaths per 100,000), while the rates for Japan (26.5) and France (29.0) were considerably lower than the Canadian rate.

This was especially true for women in France who had the lowest recorded mortality rate from AMI (17.5 deaths per 100,000) of all the countries in the 1997 comparison. Men in Japan had a mortality rate for AMI of 36.8 deaths per 100,000. Rates of mortality due to AMI are lower in Canadian women than those in Australia, Ireland, Norway and the USA, and similarly for Canadian men, with the exception of the USA, where rates are slightly lower than those found for men in Canada. Without exception, the rate of deaths from AMI in women is consistently below that found in men.

The contributions of diet to cardiovascular disease are well documented. Energy dense diets high in saturated fat in particular not only contribute to obesity, a significant risk factor in its own right, but also impact upon blood lipid levels, increasing the likelihood of the development of atherosclerotic plaques, and ultimately heart attacks [155]. Countries where both obesity, and intakes of fat from animal and dairy sources is low may therefore experience preventative benefits that result in lower mortality rates from AMI being observed. Smoking and lack of physical activity too are modifiable risk factors for cardiovascular disease, and as such may add to the risk of mortality from AMI.

The treatment of patients is a rapidly evolving field with much research being directed into the use of thrombolytic therapy, and aspirin as effective measures for the treatment of newly diagnosed cardiovascular problems[156]. The reasons that Canadian mortality rates are somewhat lower than those reported in other countries maybe due to the increased use of these early therapeutic responses to the onset of cardiovascular disease.

The varying contributions of several risk factors, however, are likely to be contributing to the differences in mortality rates observed on an international basis.

(b) 30-day in-hospital acute myocardial infraction

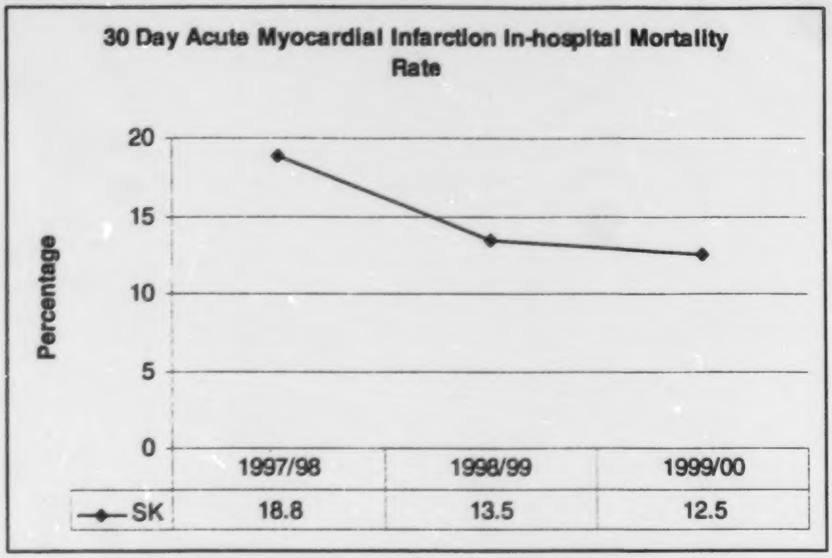
Limitations

Data have not currently been calculated for British Columbia and Quebec due to reporting differences. Although comparisons over time within these provinces may be useful, further work will be required to make fair comparisons across provinces.

Trend

Data were only available for the general population for three consecutive time points, 1997/98, 1998/99, and 1999/00. The 30-day AMI related in-hospital mortality rate decreased in Saskatchewan over this time, a notable decline occurring between 1997/98 (18.8%) and 1998/99 (13.5%). No estimates were available to provide separate trends for males and females.

Figure 80 AMI 30-day In-hospital Mortality: Saskatchewan Trend, 1997-2000



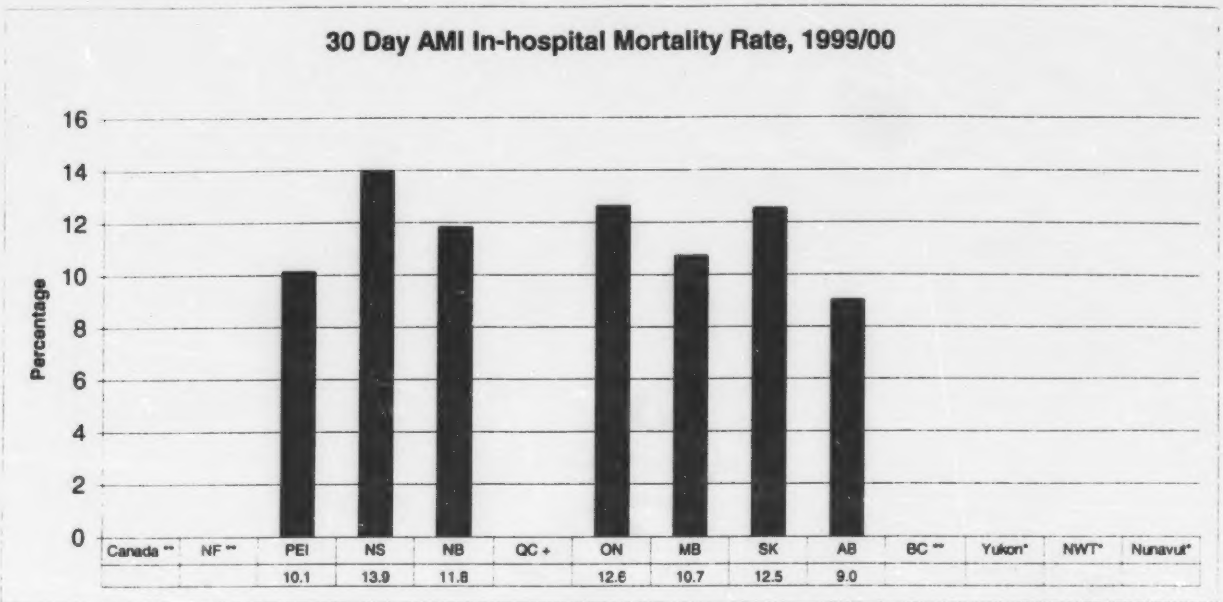
Source: Hospital Morbidity Database, CIHI

Early recognition of the warning signs of the onset of heart attacks can have a significant impact on reducing mortality rates for AMI. Ease of access to the healthcare system, a willingness to use the healthcare system, and proficient and accurate diagnosis and treatment are, also likely to be factors that must be considered.

Provincial/territorial comparisons

Saskatchewan had a rate of 12.5% of deaths occurring out of all AMI admissions in a 30-day period. This was only slightly lower than Ontario, which had a rate of 12.6% of AMI deaths. The national average is based only on provinces for which data was currently available.

Figure 81 AMI 30day In-hospital Mortality: Provincial Comparison, 1999-00



Canada **	NF **	PEI	NS	NB	QC +	ON	MB	SK	AB	BC **	Yukon*	NWT*	Nunavut*
		10.1	13.9	11.8		12.6	10.7	12.5	9.0				

Source: Hospital Morbidity Database, CIHI

* data suppressed due to small numbers
** data not available
+ data are forthcoming and not yet available for presentation

Increasing public awareness of the risk factors for cardiovascular disease, in aboriginal and non-aboriginal populations alike, must remain a key goal of strategies aimed at reducing the mortality rates from AMI at the provincial and national levels.

(c) Potential years of life lost

Acute myocardial infarction (AMI) is one of the major components of cardiovascular disease (CVD), which to date, remains the major cause of death in Canada. AMI is the third leading cause of premature mortality after injuries and cancer [157].

Major risk factors, such as smoking, physical inactivity, obesity and diabetes continue to contribute to the increasing rates of heart disease in Canada. Differences in these disease risk factors with respect to gender, age, and other social determinants of health create differences in the burden of premature mortality between various groups in the population[158].

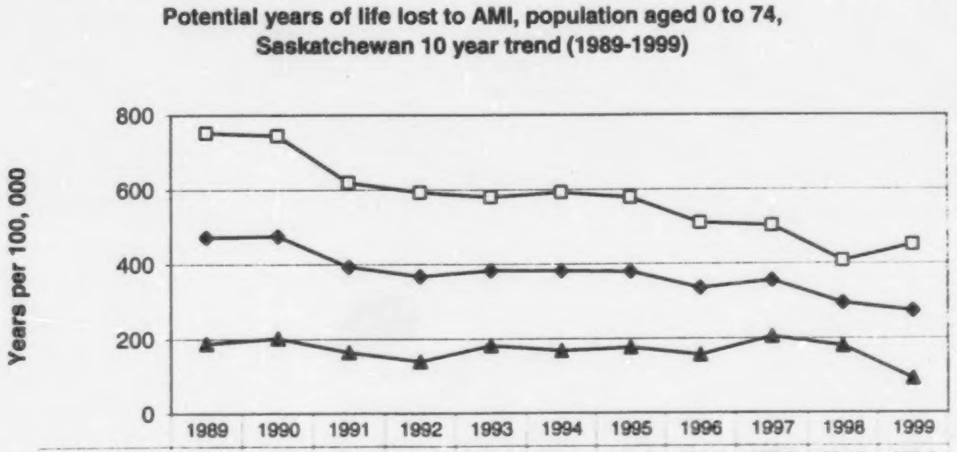
Limitations

In the 1970s and 1980s, Canadian PYLL estimates were based on age<70. Other cut-offs have been used by different countries and at different points in time. Any work done now on PYLL based on <age 75 will differ from published data on PYLL from most previous Canadian sources and should not be compared with each other. The choice of age 70 or 75 is arbitrary, and does not greatly affect time trends or inter-provincial comparisons. International comparisons should also be interpreted with caution, as differences exist between countries in the accuracy of recording, and reporting requirements, for deaths from AMI.

Trend

The number of years of life lost per 100, 000 population due to AMI declined steadily from 1989 to 1999 in the general population in Saskatchewan. Rates of premature mortality due to AMI were notably higher for men and women in 1989 than they were ten, and even five years later. The largest declines in PYLL per 100, 000 of the population were observed for the periods between 1990 and 1991, and then again between 1997 and 1998.

Figure 82 AMI PYLL: Saskatchewan Trend, 1989-99



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both	472.6	475.7	393.5	368.1	383.0	382.4	380.2	335.2	355.5	294.9	273.2
—□— Male	752.3	744.8	619.4	592.9	580.7	592.7	579.2	510.4	502.7	407.8	450.7
—▲— Female	188.0	202.0	164.1	139.6	181.8	168.2	176.9	156.5	205.2	179.8	92.3

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Recent initiatives within Saskatchewan to reduce the incidence and burden posed by cardiovascular disease in general have been directed towards prevention programs that are population-based as well as individually oriented. The Saskatchewan Heart Health Project (SHHP) was developed within the framework of the federal-provincial Canadian Heart

Health Initiative (CHHI). This project was a collaborative effort between federal and provincial departments of health and the Heart and Stroke Foundation designed to reduce the prevalence of risk factors associated with cardiovascular and related diseases. Concomitantly, by reducing these risk factors the projects key aim is to lessen the socio-economic, demographic and geographic inequalities in related risk factors associated with such diseases[159].

Data from the Heart Health Survey conducted in Saskatchewan (Saskatchewan Health 1989-1990) was used to develop a provincial epidemiological database pertaining to the risk factors for cardiovascular disease (cigarette smoking, high blood pressure, high blood cholesterol, low levels of physical activity). From this data, risk factors were clearly prevalent in the Saskatchewan population, with approximately 66% of people in Saskatchewan having one or more of the major CVD risk factors. Again, adults in the lower socio-economic groups appeared to be at greater risk. Furthermore, rural residents, in particular men aged 35 – 54 years of age, were more likely than urban dwellers to be physically inactive during leisure time, to be obese, to have high blood pressure and elevated blood cholesterol[160].

Sex and Age

The trend for PYLL to be lower in 1999 than 1989 was true regardless of sex. Males accounted for more of the premature deaths due to AMI (752.3 years per 100, 000) than females (188.0 years per 100, 000) in 1989, a trend which continued throughout the ten year time period. Lower rates of premature death due to AMI in women may be a result of the documented preventative effect that estrogen has on heart disease for pre-menopausal women[161], although the role of estrogen as a preventive factor in heart disease has recently been questioned in the research literature [162].

Improvements in the rate of premature deaths due to AMI culminated in the lowest PYLL per 100, 000 population being recorded for males in 1998 (407.8 years per 100, 000). The slower rate of decline for females, with respect to premature deaths from AMI, over the same time period may be due to a possible ceiling effect related to this substantially lower baseline PYLL than is recorded for males.

The difference in premature mortality rates between men and women is considerably higher with respect to acute myocardial infarction (AMI) than for other forms of vascular pathology such as stroke, or indeed for other PYLL indicators. Although there has been a trend in the general population for PYLL due to AMI to decrease in recent years, men experience approximately twice the premature mortality rates of women for AMI, at least until women reach the age of menopause.

It is not the case, however, that women are not at risk from AMI, but that they tend to develop heart problems later in life than do men. In fact, heart disease kills more women over 65 than all cancers combined. Consequently, this is reflected in sex differences in the PYLL due to AMI at both the national (477.8 years per 100, 000 in men compared to 144.9

years / 100, 000 in women), and provincial level (450.7 as opposed to 92.3 years per 100, 000 for men and women respectively). Females in Saskatchewan actually had the lowest rates of premature mortality due to AMI of any province in 1999.

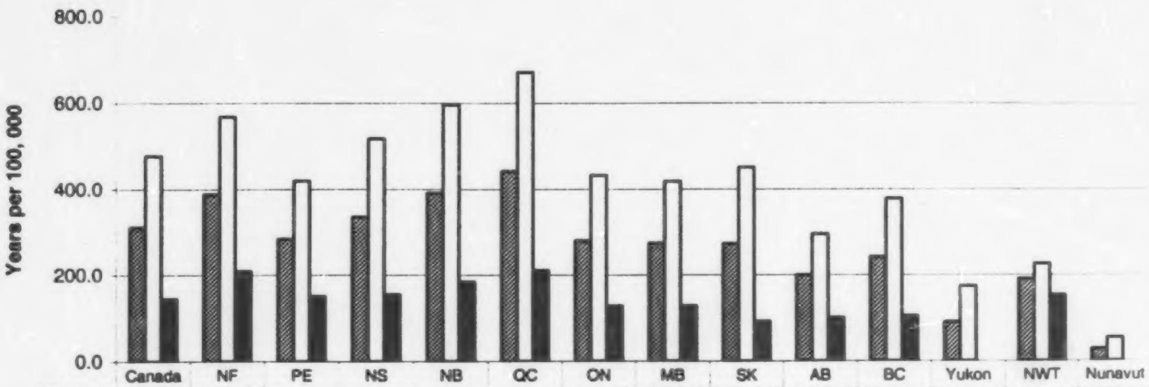
Provincial/territorial comparisons

Data from the Yukon, Northwest Territories and Nunavut should be interpreted with caution due to small sample sizes, and for this reason they are not generally comparable to other provincial averages. Saskatchewan has the third lowest PYLL rate among the provinces. The rate of premature death of the population in Saskatchewan due to AMI in 1999 (273.2 years per 100, 000) remained lower than the Canadian average (321.1 years per 100, 000), and is comparable to other provinces in the country.

The rate of PYLL in males remains somewhat higher than for females across all provinces. The rate of premature death for females in Saskatchewan, was actually the lowest (92.3 years per 100, 000) of the provinces in 1999, and lower than the national average (144.9 years per 100, 000). The potential years of life lost due to AMI for males in Saskatchewan was 450.7 years per 100, 000 in 1999, below the national average of 477.8 years per 100, 000.

Figure 83 AMI PYLL: Provincial Comparison, 1999

Potential years of life lost to AMI, population aged 0 to 74, by sex, Canada and provinces, 1999



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	312.1	389.3	284.8	336.0	392.0	442.1	280.6	274.6	273.2	200.1	242.5	90.2	191.7	28.1
☐ Male	477.8	568.3	419.3	517.9	596.8	671.9	433.1	418.1	450.7	296.0	378.7	173.9	227.0	53.6
■ Female	144.9	209.6	150.9	155.0	185.0	211.2	128.2	128.6	92.3	100.3	104.6	0.0	153.9	0.0

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

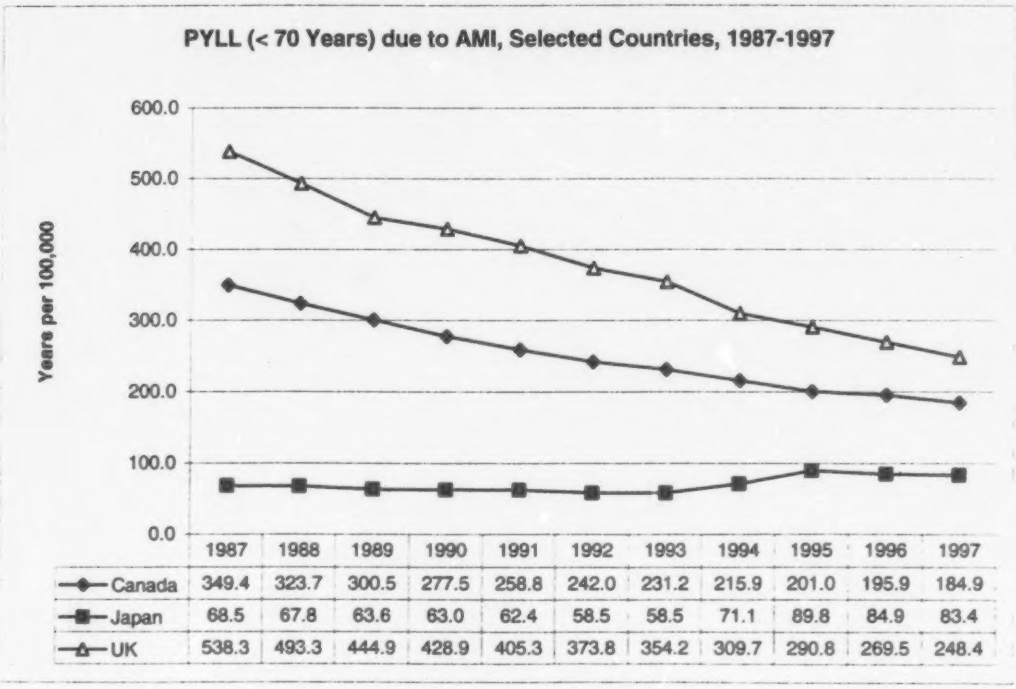
Note: Potential years of life lost for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

Measured in terms of Potential Years of Life Lost (PYLL) the rates presented here both nationally and for Saskatchewan are reflective of the seriousness of this disease in terms of the number of potentially premature deaths. In terms of the social and economic burden placed on society by premature death, addressing the causes of PYLL may be expected to have a major impact on the life expectancy and health status of a population.

International Comparisons

Although several countries have used different cut-off points for the measurement of PYLL, the choice of age as 70 or 75 years is arbitrary and does not greatly affect time trends. Data from the Organization for Economic Cooperation and Development (OECD, 2001) highlights the changes in premature death from AMI in Canada with reference to the highest and lowest rates of PYLL found in other parts of the world.

Figure 84 AMI PYLL: International Comparison



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
◆ Canada	349.4	323.7	300.5	277.5	258.8	242.0	231.2	215.9	201.0	195.9	184.9
■ Japan	68.5	67.8	63.6	63.0	62.4	58.5	58.5	71.1	89.8	84.9	83.4
△ UK	538.3	493.3	444.9	428.9	405.3	373.8	354.2	309.7	290.8	269.5	248.4

Source: Organization for Economic Cooperation and Development

The highest rates of premature death as a result of AMI are recorded for the UK. Between 1987 and 1997 a decreasing trend in premature mortality from AMI is noted in Canada and the UK, however, UK rates remain higher than the PYLL per 100, 000 of population in Canada in all years. Japan exhibits significantly lower rates of premature deaths from AMI than any country. Interestingly though, rates of PYLL have actually started to increase in Japan from 1994, and are now higher than they were in 1987. Comparisons between Canada and these two nations provide benchmarks from which premature mortality rates due to AMI can be evaluated.

4.2 Stroke

Mortality rates from stroke, although substantially lower than other forms of cerebrovascular disease, continue to represent a toll on the population in terms of personal, community and health care costs. While scientific knowledge continues to highlight that heart disease and stroke are preventable, the process of reducing mortality rates is complex and requires action at several levels. Furthermore, changes in the age structure and ethnic background of the population have highlighted the need to target programs for risk reduction to ensure that the specific needs of individuals from a variety of backgrounds are met. This is especially true within the Saskatchewan context, where the Aboriginal population continues to rise, as too does the percentage of individuals living to old age. Both age and aboriginal status (which carries with it an increased prevalence of several risk factors such as high blood pressure, smoking, diabetes, lack of physical activity and poor diet) have been associated with higher rates of mortality from stroke[178].

Advances in primary prevention aimed at reducing the incidence of risk factors associated with the disease, secondary prevention improvements in early detection and treatment, and tertiary prevention in terms of limiting the advancement of established disease, have all contributed to a declining mortality rate for stroke in recent years. There have been suggestions in the literature that more must be done on modifying not only risk factors but also risk conditions such as poverty, powerlessness and lack of social support [163].

The majority of work continues to focus on reducing individual risk factors such as high blood pressure, smoking, poor dietary practices (such as high saturated fat intakes) and physical inactivity. Increasing physician and patient awareness of risk factors has been identified as one prevention strategy for targeted prevention strategies. The Saskatchewan Clinical Stroke Prevention Project Research Group (Saskatchewan Stroke Research Centre, U of S), an interdisciplinary team, has recently been conducting research in the province towards this goal.

Since smoking and exposure to tobacco smoke remains a significant independent risk factor for stroke, accounting for more than 2,000 deaths per year at the national level, the recent smoke-free policy for restaurants in the province makes a contribution to reducing tobacco-related deaths. High blood pressure remains the number one preventable risk factor for stroke with an estimated 56.4% (males) and 66.1% (females) of strokes attributable to this factor [164].

Low levels of physical activity diets rich in saturated fat and sodium, and diets low in fruits and vegetables contribute to the likelihood of high blood pressure. Obesity levels, which also vary provincially, are also an important risk factor for stroke. In view of the levels of physical inactivity in the province (48.9% of individuals aged 12 years and older being classified as inactive), the potential contribution to elevated stroke risk may be substantive.

Although guidelines have been in place in the province for cholesterol testing and treatment, the Health Services and Utilisation Research Commission in Saskatchewan has recently advanced the opinion that more focus should be placed on risk factors such as smoking, physical inactivity, diabetes, adiposity and high blood pressure [165]. The fact that lower fat diets have become more popular in recent years, and that there has been a trend for rates of smoking to decrease in the last twenty years coincides with the declining mortality rates for stroke observed provincially and on a national basis.

Aboriginal populations tend to experience multiple risk factors for cardiovascular disease and stroke, more so than individuals in the general population. The age-standardized mortality rate from stroke in aboriginal men is decreasing, as is the relative difference between their mortality rates and those of the general Canadian population, However, Aboriginal women continue to experience higher mortality rates than the general Canadian female population for both ischemic heart disease and stroke [183].

Over and above the contribution that the near epidemic levels of diabetes make to stroke-related mortality, a higher prevalence of other risk factors such as high blood pressure, obesity and smoking may account, in part, for this trend [166]. The differences between aboriginal and non-aboriginal women has decreased in the past decade, however, questions have been raised about whether these reflect the general trend among Canadians overall, or are the result of programs aimed specifically at aboriginal groups[183].

The growing aboriginal population in Saskatchewan highlights the need to target risk factors in this population specifically to reduce the significant impact that stroke has on the province in general.

(a) Mortality rate

Age-standardized stroke death rate trends may indicate long-term success in reducing deaths from these diseases, compared with other provinces and countries. Lower death rates indicate success in cardio-vascular disease prevention, detection, and treatment.

Although the incidence rates for stroke have started to plateau [167], it is also believed, that strokes are becoming, if not less frequent, less devastating. The number of people dying from stroke declined throughout the 1990s.

Limitations

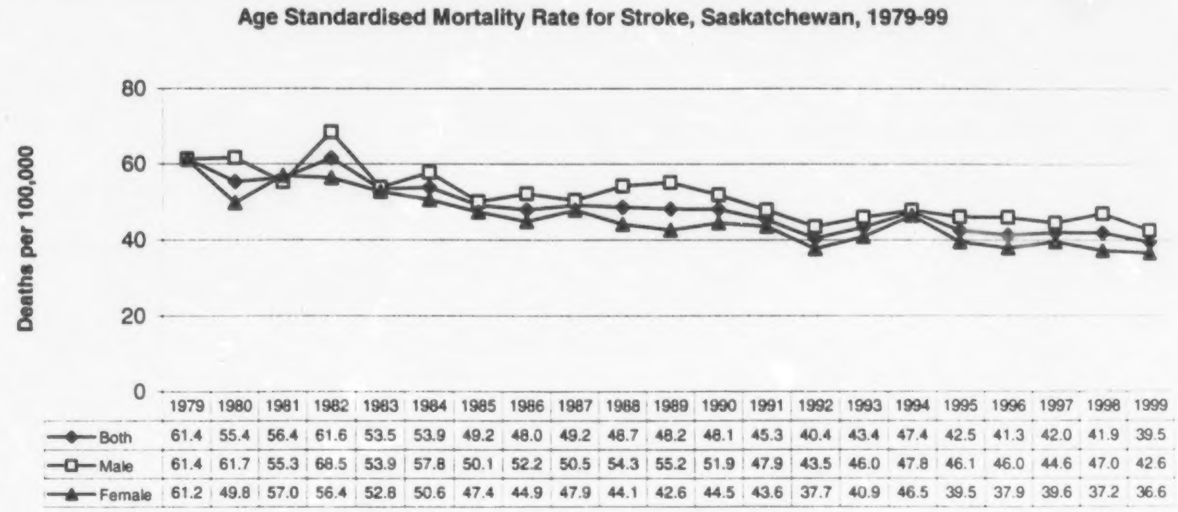
From 1979 to 1999, the underlying cause of death was coded using the International Classification of Diseases, 9th Revision (ICD-9); beginning with 2000, the underlying cause of death will be coded using ICD-10, thus introducing discontinuity to the trend data.

Trend

Overall, mortality rates due to stroke decreased in Saskatchewan between 1979 and 1999. A relatively consistent decline was noted from 1979 (61.4 deaths per 100,000) to 1999 (39.5 deaths per 100, 000).

The rates of mortality due to stroke remain relatively similar between males and females. Although the rate of death from stroke tends to be higher for men, the difference between the two genders is relatively small. The largest recorded difference occurred in 1989 when the death rate for Saskatchewan men (55.2 per 100,000) exceeded that of women in the province (42.6 per 100,000) by 12.6 deaths per 100,000. Overall, a decline in the mortality rate for stroke was noted for men and women. For men, there was a decrease from a high of 68.5 deaths per 100, 000 in 1982 to a low of 42.6 deaths per 100,000 in 1999. The recorded death rate for women in 1979 was 61.2 deaths per 100, 000, and by 1999 this had decreased to 36.6 deaths per 100,000.

Figure 85 Stroke Mortality: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Both	61.4	55.4	56.4	61.6	53.5	53.9	49.2	48.0	49.2	48.7	48.2	48.1	45.3	40.4	43.4	47.4	42.5	41.3	42.0	41.9	39.5
□ Male	61.4	61.7	55.3	68.5	53.9	57.8	50.1	52.2	50.5	54.3	55.2	51.9	47.9	43.5	46.0	47.8	46.1	46.0	44.6	47.0	42.6
▲ Female	61.2	49.8	57.0	56.4	52.8	50.6	47.4	44.9	47.9	44.1	42.6	44.5	43.6	37.7	40.9	46.5	39.5	37.9	39.6	37.2	36.6

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

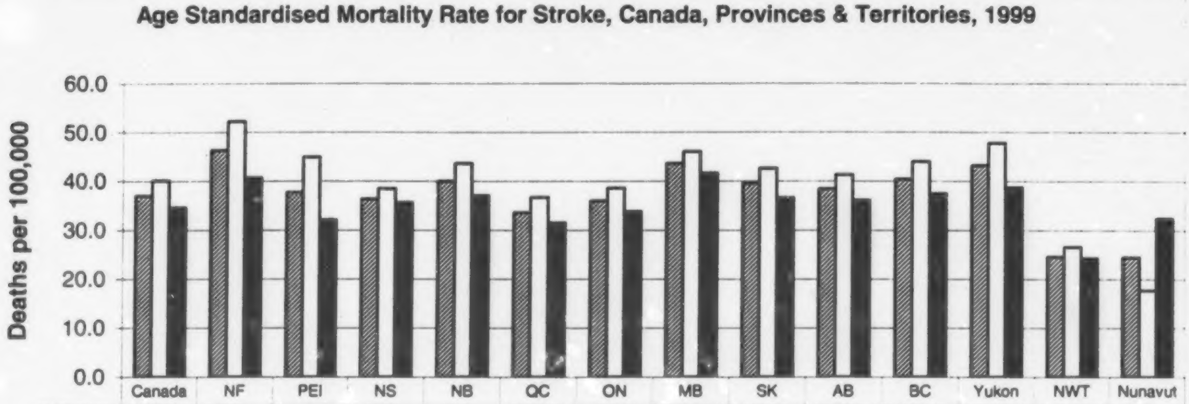
Provincial/territorial comparisons

In general, the mortality rates for stroke are similar across jurisdictions in Canada. Only in the Northwest Territories and Nunavut are the recorded rates lower than those observed nationally or on a provincial basis.

In Saskatchewan, the rate of death from stroke in the general population (39.5 deaths per 100,000) is slightly above the national average (37.0 deaths per 100,000). Quebec the lowest rate of death from stroke (33.6 deaths per 100,000), outside of those observed for the Northwest Territories (24.6 deaths per 100,000) and Nunavut (24.5 deaths per 100,000).

Men tend to have a higher mortality rate for stroke than do women. The difference, however, tends to be quite small in general. Nationally, the male mortality rate for stroke in 1999 was 40.1 deaths per 100,000, whereas for women it was 34.6 deaths per 100,000. A similarly small sex difference was also observed in Saskatchewan. In 1999 there were 42.6 deaths per 100,000 in men due to stroke, compared to 36.6 deaths per 100,000 for women in the same year.

Figure 86 Stroke Mortality Rate: Provincial Comparison, 1999



	Canada	NF	PEI	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	37.0	46.3	37.7	36.4	40.0	33.6	36.0	43.8	39.5	38.4	40.4	43.2	24.6	24.5
☐ Male	40.1	52.3	44.9	38.5	43.6	36.7	38.6	46.0	42.6	41.3	44.0	47.8	26.6	17.7
■ Female	34.6	40.7	32.1	35.7	37.1	31.5	33.8	41.6	36.6	36.1	37.5	38.7	24.3	32.4

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

__Note:__ Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to small underlying sample sizes.

International Comparisons

As cause of death information is based on reports provided at the registration of the death, good quality information depends on the reporting of all deaths and that the cause-of-death was routinely reported on the death record, consistent with the International Classification of Diseases. Therefore, inter-country comparisons should be interpreted with caution, as it is likely that differences exist in the completeness of death registration coverage.

In this section the estimates are based on the OECD Health Data 2001 report on age-standardized death rates. This data set provides the most complete, and contemporary information, and is standardized against a population that is similar to the Canadian standard population used for Federal/ Provincial/ Territorial reporting.

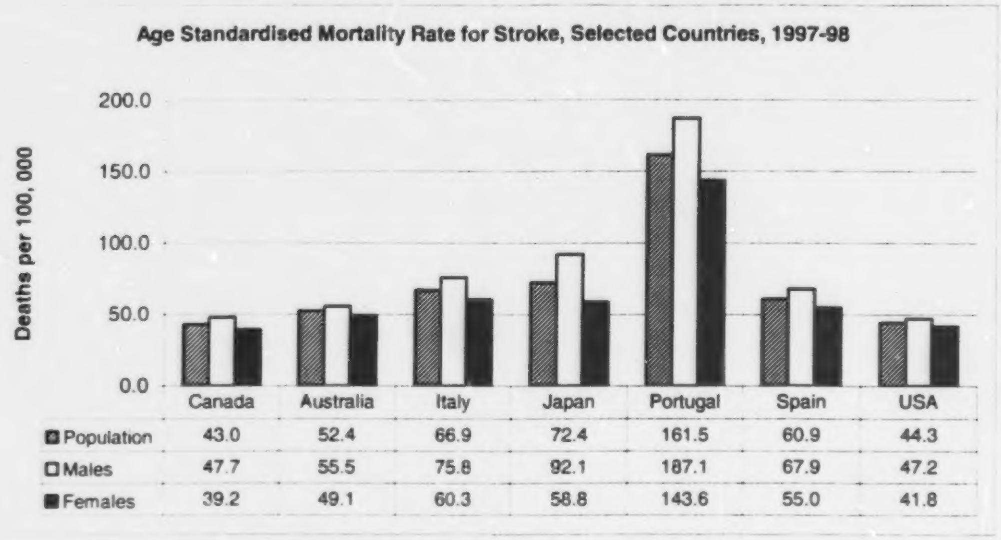
Estimated mortality rates are based on the number of deaths according to sex and selected causes as provided by the World Health Organization, then the age standardized death rates per 100, 000 of the population are calculated by the OECD secretariat. The total population for 1980 is used as a reference for standardisation. For further information, details on the coverage and reliability of cause-of-death estimates are regularly published in the World Health Statistics Annual.

The age standardized mortality rates are a useful benchmark from which Canadian data can be evaluated with reference to international standards, as they control for the differences in the age structure of the population.

The estimates presented below represent the most recent year of data available for selected countries. Only those countries that had data from a similar time period as that for which Canadian data were available (1997) are presented from the total listing of all 23 OECD countries. Data from other years were included if it was considered instructive to do so for example if they represented either the highest or lowest mortality rates of the international data set.

The Canadian mortality rate for stroke was relatively low in 1997 (43.0 deaths per 100,000) in comparison to other countries. As a comparison Portugal's rate was 161.5 deaths per 100,000 while Japan's was 72.4 per 100,000. The rates of death for stroke are similar between Canada and the United States. The decline in stroke-related mortality in Canada over the last twenty years has been attributed to lower rates of incidence and improved survival [168]. It is likely, that improvements in risk factor management and health promotion, targeting smoking cessation, diet, exercise, and weight control in particular, have contributed to Canada's lower rates of mortality for stroke internationally.

Figure 87 Stroke Mortality Rate: International Comparison



	Canada	Australia	Italy	Japan	Portugal	Spain	USA
▨ Population	43.0	52.4	66.9	72.4	161.5	60.9	44.3
☐ Males	47.7	55.5	75.8	92.1	187.1	67.9	47.2
■ Females	39.2	49.1	60.3	58.8	143.6	55.0	41.8

Source: Organization for Economic Cooperation and Development

International comparisons must be interpreted cautiously given the different data collection methods and reporting periods.

Several factors may account for international differences in mortality rate for stroke. Dietary and physical activity behaviours, smoking habits, and the control of high blood pressure in the population are all likely to vary on an international basis, as too is the detection and early treatment of the symptoms of stroke. Intensive research in countries such as Canada and the United States, on the cerebral injury suffered during stroke has opened the way for therapeutic interventions to improve outcomes, and decrease the rate of stroke-related fatalities [169]. Much of the difference between countries, however, remains unexplained [170]. These comparisons serve to highlight, nevertheless, Canada's relatively low rates of mortality from stroke on an international basis, which may be reflective of success in preventing and treating early stages of the disease.

(b) 30-day stroke mortality rate

Stroke is a leading cause of death and disability in the Canadian population. The risk-adjusted mortality rate is an important measure of variations in mortality, which may be due to a number of factors, including emergency treatments, quality of care in hospitals, primary care and prevention, or socio-economic factors. The mortality rate is an important indicator in monitoring stroke outcomes over time, and may reflect advances in prevention and treatment.

For the purposes of this section we will look at the risk adjusted rate of all cause in-hospital death occurring within 30 days of admission to an acute care hospital with a diagnosis of stroke.

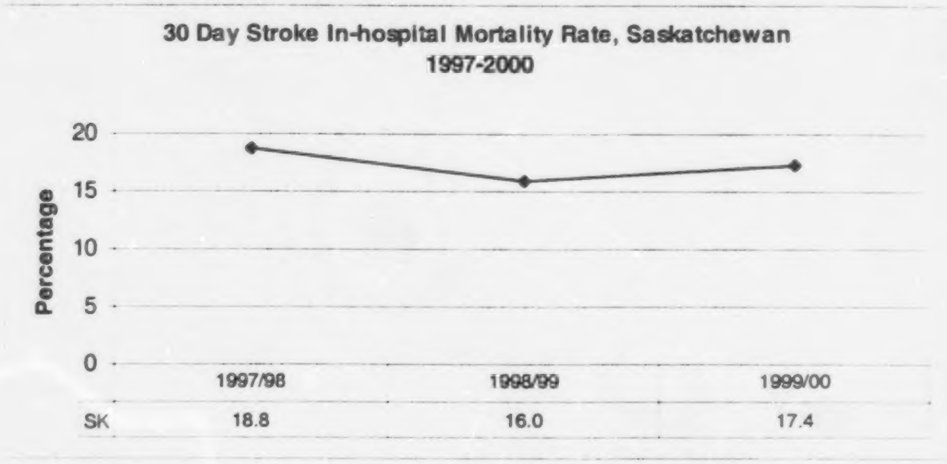
Limitation

30-day stroke mortality rates are not adjusted for patient acuity.

Trend

Data were only available for three consecutive time points, 1997/98, 1998/99, and 1999/00. The 30-day stroke-related mortality rate that occurred in Saskatchewan fluctuated slightly between 1997 and 2000 ranging from 18.8% of all stroke admissions in 1997/98 to 16.0% in 1998/99 and 17.4% in 1999/2000. This measure is under development, and as a result no data is presently available to compare sex differences in 30-day in-hospital mortality due to stroke.

Figure 88 Stroke 30 day In-hospital Mortality: Saskatchewan Trend, 1997-2000



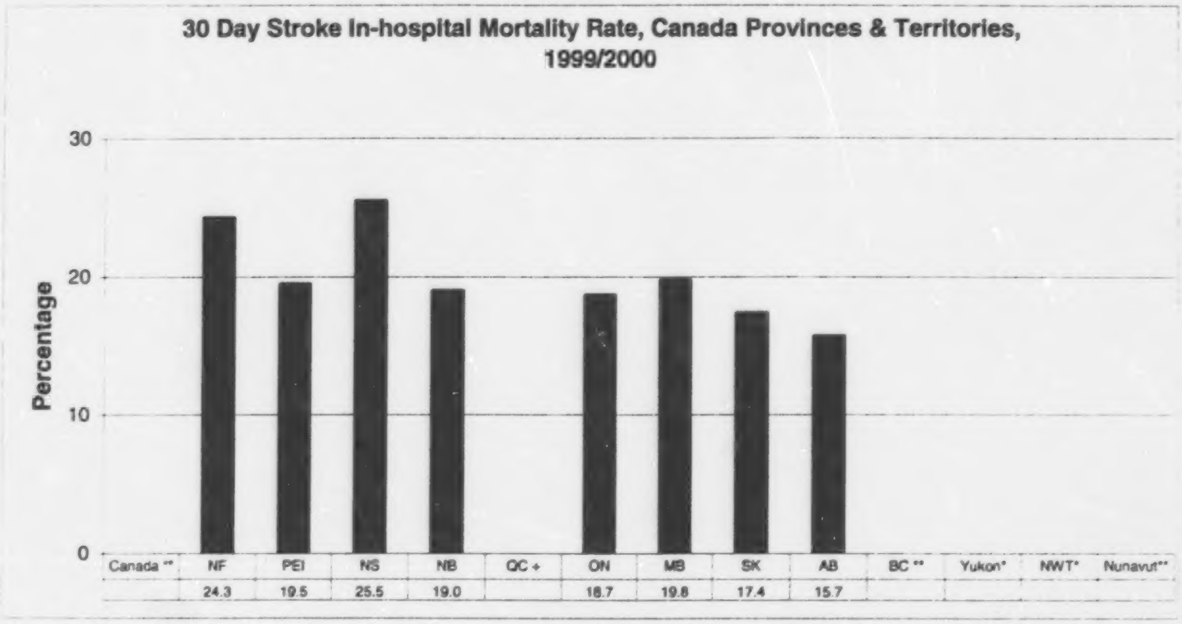
Source: Hospital Morbidity Database, CIHI

Provincial/territorial comparisons

Of the provinces for which a recent estimate of 30-day in hospital mortality from stroke was available, Saskatchewan had the 2nd lowest rate of deaths at 17.4% after Alberta at 15.7%.

A three-year pooled average (1997-99) is available as a national estimate, and is presented in the table below along with the 3-year averages for all the provinces for which data was available. This national rate, however, is based only on the existing provincial estimates for which data was currently available.

Figure 89 Stroke 30 day In–hospital Mortality: Provincial Comparison



Source: Hospital Morbidity Database, CIHI

* data suppressed due to small numbers
** data not available
+ data are forthcoming and not yet available for presentation

In Canada, the declining mortality rate due to stroke over the past 20 years has been attributed not only to a decreased incidence, resulting from better risk factor management, health promotion, and medical management of hypertension, hyperlipidemia, diabetes, and cardiovascular disease, but also improved survival following stroke.

It is believed that strokes are becoming less devastating due to the better understanding of the mechanisms, and management of acute stroke. Successful outcomes have been attributed to the provision of therapy to minimise brain damage, which has entailed better education for at-risk individuals and their family members on the appearance of acute stroke symptoms. Early arrival to a hospital with an acute stroke care unit considerably improves the prognosis for that individual [183].

Although considerable progress has been made in identifying the multiple factors that contribute to stroke-related mortality, all forms of vascular disease, of which stroke is just one, continue to prevail as the major cause of death, disability and illness in Canada. In order to continue to address this issue, collaboration at the provincial, national and international level is needed.

Health promotion activities in risk factor areas such as nutrition, blood pressure, and physical activity remain key areas of interest, in addition to the need to provide culturally sensitive programs that can address the needs of individuals from varied ethnic and age-related backgrounds. Research into the early detection and management of stroke can also help reduce mortality rates still further, as well as the provision of services that can apply these techniques. Indeed, it is likely that prevention at all levels will be needed if the trend for declining rates of stroke-related mortality in Canada is to continue for another twenty years.

Response to stroke requires a systems approach, which defines and describes the essential components and arranges them systematically to form an effective whole. Components include prevention, pre-hospital and emergency care, hospital care, rehabilitation and reintegration into the community. [171]

International Comparison

Limited international data on 30-day in-hospital mortality from stroke is available for comparison to Canadian estimates, therefore, international comparisons with Canada cannot be made.

(c) Potential years of life lost

Cerebrovascular disease, which by definition encompasses stroke as a specific sub-group, is the third most common cause of death in North America after heart disease and cancer. Although premature mortality rates for stroke are lower than for heart disease or cancer, survival after stroke usually implies some degree of lost function, consequently making stroke the leading cause of unemployment disability in Canada.

In Saskatchewan approximately 1,400 people suffer some form of lasting disability as a result of stroke each year [172]. The social and economic loss to the province and nation in terms of the potential years of life lost due to cerebrovascular disease and stroke remains sizeable and stresses the importance of preventive, pre-hospital and emergency care to decrease the number of premature deaths from all forms of cardiovascular disease, including stroke.

High blood pressure remains the number one potentially modifiable risk factor for stroke with an estimated 56.4% (males) and 66.1% (females) of strokes attributable to this factor[173].

Smoking, physical inactivity, and diabetes also contribute to the likelihood of cerebrovascular problems. The higher rates of diabetes (predominantly adult-onset) found in Aboriginal populations puts them at an increased risk of premature mortality due to stroke. High blood pressure is also a common problem for Canadians of First Nations/ Aboriginal descent, and again is a condition that can lead to stroke. This may in part help explain why the rates of premature mortality due to cerebrovascular disease and stroke are above the national average in Saskatchewan. Research shows that increasing participation in physical activity can also lead to a decrease in the incidence of stroke [174].

Limitation

In the 1970s and 1980s, the Canadian PYLL estimate was based on age <70. Other cut-offs have been used by different countries and at different points in time. Any work done now on PYLL, based on age < 75, the current Canadian cut-off, will differ from historical data on PYLL. The choice of age 70 or 75 is arbitrary, and does not greatly affect time trends or inter-provincial comparisons.

Trend

The incidence of premature deaths as a result of strokes varied over the 1989 to 1999 period in Saskatchewan. Although the potential years of life lost for both men and women was lower in 1999 (134.5 years per 100, 000) than it was in 1989 (162.5 years per100, 000), the rate of change has been gradual and marked by variability. The lowest rate of PYLL due to stroke actually occurred in 1996 (128.1 years per 100, 000), and the highest in 1990 (177.9 years per 100, 000).

Premature mortality rates due to stroke have decreased gradually over the last ten years. This decline in stroke-related premature mortality is most probably attributable to improved hypertension control and to the decreased incidence of strokes. Better risk factor management and health promotion likely contributed to this trend, as well as advances in the understanding of the mechanisms and medical management of acute stroke.

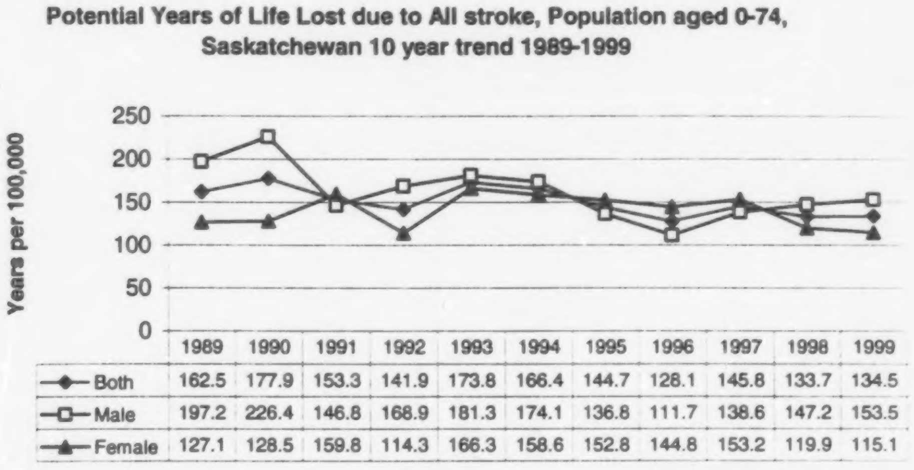
Within Saskatchewan several initiatives have been developed to address the modifiable risk factors associated with cerebrovascular disease and stroke. The Saskatchewan Stroke Research Centre was established to provide a multidisciplinary approach to increase awareness of the risk factors associated with stroke and improve the management of acute stroke. Similarly, the Saskatchewan Heart and Stroke Foundation was set up predominantly as a research unit to monitor the trends in cardiovascular disease (in all forms) in Saskatchewan and Canada, and to further understanding of the disease aetiology and increase health promotion activities and improved clinical practice.

Indeed, the overlap between coronary artery disease, peripheral vascular disease, and cerebral vascular disease, highlights that stroke prevention can be encompassed under a larger prevention strategy for all forms of vascular disease. Although internationally Canada enjoys a comparatively low rate of premature mortality due to stroke, further program development in primary, secondary and tertiary prevention can improve the health of Canadians, and reduce the impact that premature death due to stroke has on the population economically and socially.

Sex

Although rates of PYLL for men in Saskatchewan increased from 197.2 in 1989 to the highest recorded rate over the ten-year time span in 1990 (226.4 years per 100, 000), they decreased again from 1990 to 1991. Female rates in comparison increased slightly from 128.5 to 159.8 years per 100, 000 in the same year (1990-1991), and remained below those found in males until 1995.

Figure 90 Stroke PYLL: Saskatchewan Trend, 1989-99



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Both	162.5	177.9	153.3	141.9	173.8	166.4	144.7	128.1	145.8	133.7	134.5
□ Male	197.2	226.4	146.8	168.9	181.3	174.1	136.8	111.7	138.6	147.2	153.5
▲ Female	127.1	128.5	159.8	114.3	166.3	158.6	152.8	144.8	153.2	119.9	115.1

Source: Statistics Canada, Vital Statistics, Death Database, and Demography Division (population estimates). *OECD 2001 Heath Data 2001: A Comparative Analysis of 30 Countries* (Updated Version). Paris: OECD, 2001

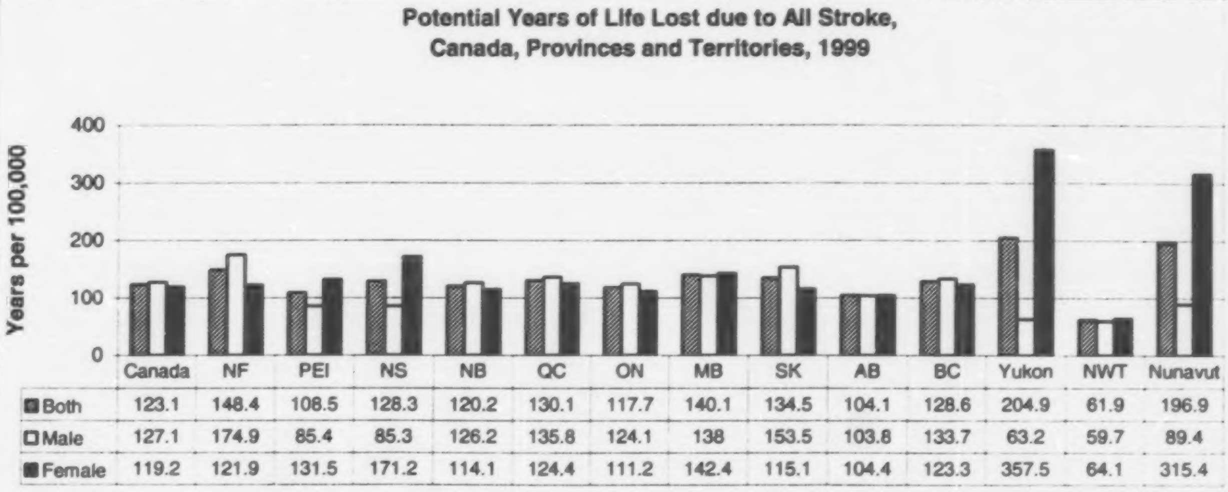
Provincial/territorial comparisons

Data from the Yukon, Northwest Territories and Nunavut should be interpreted with caution due to small underlying counts. Rates of PYLL due to stroke are relatively equivalent throughout Canada.

Saskatchewan's rate (134.5) of premature death due to stroke in 1999 was similar to the national average of 123.1 years per 100, 000. Excluding the NWT, Yukon and Nunavut the lowest recorded rate of PYLL was found in Alberta (104.1 years per 100, 000). Saskatchewan's rate was the third highest in Canada, of those jurisdictions reporting adequate sample sizes.

Nationally males experienced a slightly higher rate (127.1) of premature mortality due to stroke than females (119.2) in 1999. This trend is mirrored for the majority of provinces, with the exception of PEI and NS, where female rates exceed those of males. With the omission of the Yukon, Northwest Territories and Nunavut, the lowest rates of PYLL due to stroke for males in 1999 were found in Nova Scotia and Prince Edward Island (85.3 and 85.4 years per 100, 000). Females in Alberta experienced lower rates of premature mortality due to stroke in 1999 than any other province (104.4 years per 100, 000).

Figure 91 Stroke PYLL: Provincial Comparison, 1999



Potential Years of Life Lost due to All Stroke, Canada, Provinces and Territories, 1999

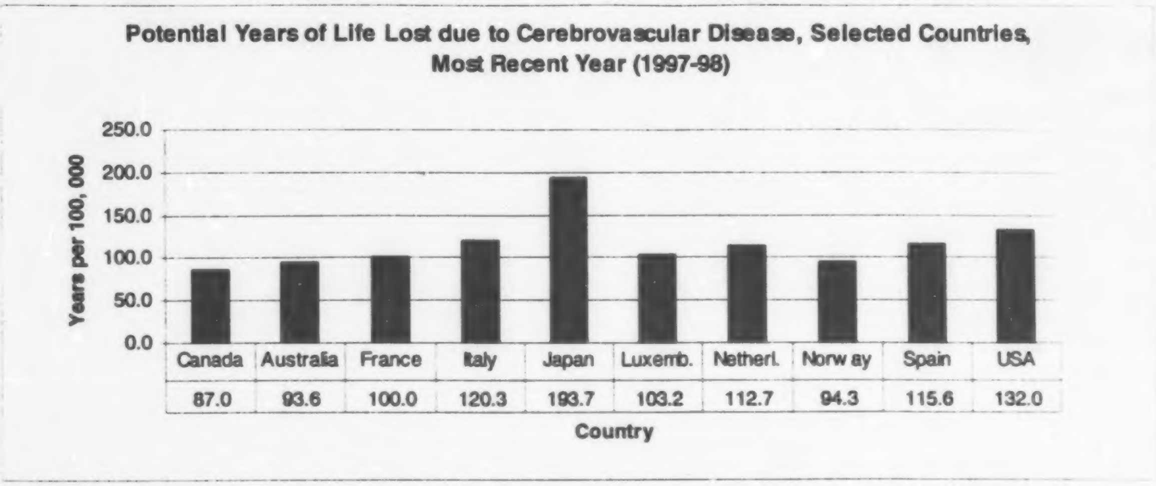
	Canada	NF	PEI	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both	123.1	148.4	108.5	128.3	120.2	130.1	117.7	140.1	134.5	104.1	128.6	204.9	61.9	196.9
☐ Male	127.1	174.9	85.4	85.3	126.2	135.8	124.1	138	153.5	103.8	133.7	63.2	59.7	89.4
■ Female	119.2	121.9	131.5	171.2	114.1	124.4	111.2	142.4	115.1	104.4	123.3	357.5	64.1	315.4

Source: Statistics Canada, Vital Statistics, Death Database, and Demography Division (population estimates). *OECD 2001 Heath Data 2001: A Comparative Analysis of 30 Countries* (Updated Version*)*. Paris: OECD, 2001

International Comparison

International comparisons are available for potential years of life lost due to cerebrovascular disease (i.e., including stroke) prior to age 70. Data provided from the OECD 2001 report are based on an arbitrary cut-off of age 70, whereas Canadian data in recent years represents PYLL prior to age 75. Therefore, Canadian rates presented here may be different than those presented elsewhere.

Figure 92 Stroke PYLL: International Comparison



Source: Organization for Economic Cooperation and Development

Although the international data refers to premature death due to cerebrovascular disease, which encompasses other types of cerebrovascular pathology as well as stroke, it provides an important benchmark from which Canadian data can be compared.

PYLL due to cerebrovascular disease was lower in Canada (87.0 years per100, 000) than any of the OECD member countries in 1997. Premature mortality rates due to cerebrovascular disease for men and women were higher in all other countries, with the highest rates of PYLL in Japan (193.7 years per 100,000).

Canadian rates of PYLL due to cerebrovascular disease are also lower in males and females than many other member countries. For males, Canada had the lowest recorded rate of premature death due to cerebrovascular disease in 1997 (95.7 years per 100, 000), with the rates for women living in Canada being the third lowest (78.5 years per 100, 000) after France (71.1 years per 100, 000) and Norway (73.3years per 100, 000) for countries with data available for 1997. This information illustrates that Canada has a comparatively low PYLL by international standards.

Select Diseases: Cancer-Related Data

The remainder of this chapter focuses on the four most commonly occurring types of cancer: breast, prostate, colorectal and lung cancer. Each type of cancer is discussed separately and in each case the Saskatchewan data is presented first to provide some insight into the local cancer trends. The Saskatchewan data is then put within the national context through a discussion of inter-provincial comparisons.

One of the limitations of such comparisons is that provincial differences in incidence rates may be affected by geographic variations in service delivery, e.g., the availability of early detection and screening programs, differences in diagnostic procedures or differential definitions and registration of site-specific cancers.

Another limitation of provincial comparisons relates to mortality data. Cancer mortality statistics are derived from death records that have been physician certified, and are maintained by the provincial and territorial registrars of vital statistics for persons residing in that province or territory at the time of death. Although these procedures have been standardized both nationally and internationally, some lack of uniformity is inevitable. As such, inter-provincial differences may reflect differences in cancer diagnoses and/or the accuracy of the information provided on the death certificate, which can be less precise than information obtained by cancer registries from hospitals and pathology records.

With respect to five-year relative survival rates for all cancers, variation in data collection methods among jurisdictions remains as an outstanding issue, limiting the comparability of the data. Caution is therefore warranted in the comparison and interpretation of five-year relative survival estimates for all cancer sites reported. Furthermore, it is not possible to examine trends over time in this data as at present data are only available for one year.

Lastly, an attempt is made to compare the national data for each type of cancer with a select group of international countries. Data from the Organization for Economic Co-operation and Development (OECD) 2001 report provides estimates for countries similar to Canada in terms of standard of living. Discrepancies between nationally available data and that provided by the OECD 2001 report may exist due to differences in the standard population used. It is further noted that the rates presented here are standardized to the world standard population, for which no specific reference is provided.

Caution is warranted in the interpretation of these comparisons, as differences may exist in the extent to which the data is representative of the country as a whole. Canada is one of the few countries in the world having a system of population based cancer registries covering most of the country's population. Cancer registries elsewhere in the world may not be population based and instead only cover urban areas or small regions of the country. Furthermore, differences in diagnosis between countries on an international basis may also exist. Nevertheless, the comparison between countries remains interesting and a worthwhile practice in terms of providing benchmark data from which Canadian national data can be evaluated.

4.3 Female Breast Cancer

All references to breast cancer are based on the definition provided by the Ninth Revision of the International Classification of Diseases (ICD-9). Breast cancer is defined as malignant neoplasm of the female breast (174).

(a) Incidence rate

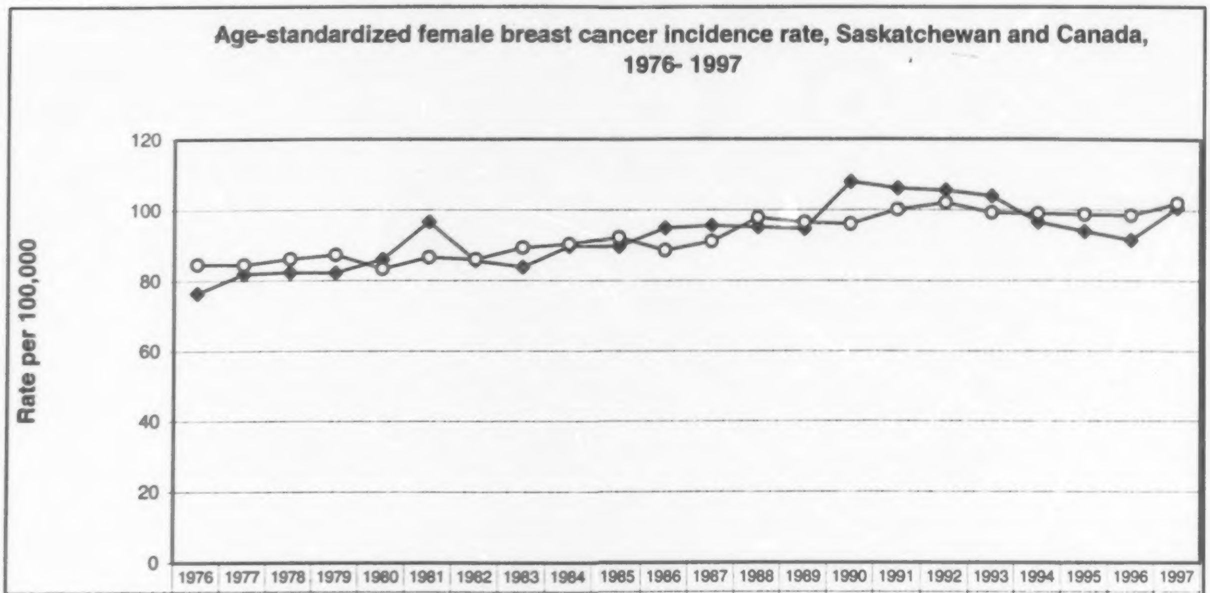
Trend

This analysis focuses on breast cancer occurring in females. Although it is possible for men to have breast cancer, it occurs far more frequently in women. According to records from the Canadian Cancer Registry (1992), for about every 140 cases that occurred in Canadian women, one case of breast cancer was diagnosed in a man.[175] From this point on female breast cancer will be referred to only as breast cancer.

Breast cancer is the most frequently diagnosed cancer among Canadian women.[176] It is also one of the leading health problems among women, particularly those over the age of 50. Almost one in ten is likely to develop breast cancer in her lifetime, and one in 26 is expected to die from it.[177]

Saskatchewan's age-standardized breast cancer incidence rate increased by 32 per cent from 76.4 cases per 100,000 females in 1976 to 100.7 cases per 100,000 females in 1997. A similar trend was reported at the national level. These increases in the incidence of breast cancer may be related to early detection through breast self-examination, as well as increased mammography screening. Since mammography detects breast cancers earlier than they otherwise would have been diagnosed, an increase in mammograms can be expected to produce an initial upturn in incidence. This would not be as a result of more cancer, but because tumours are being detected at an earlier stage. It is believed that this artifactual increase in the incidence rate because of earlier date of detection will eventually disappear as the rate falls back to its natural level.[178]

Figure 93 Breast Cancer Incidence Rate: Saskatchewan Trend, 1976-97



	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
—◆— Saskatchewan	76.4	81.8	82.3	82.2	86.0	96.6	85.6	83.8	89.6	89.7	94.9	95.5	95.1	94.6	107.9	106.1	105.5	103.9	96.5	93.9	91.6	100.7
—○— Canada	84.6	84.4	86.1	87.3	83.3	86.5	86.0	89.3	90.3	92.2	88.6	91.1	97.8	96.4	96.0	100.1	102.0	99.2	98.9	98.7	98.5	102.0

Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

The likelihood of a woman developing breast cancer increases rapidly with age[179] making age the most significant risk factor for breast cancer. Other risk factors for breast cancer include a family history of breast cancer, a history of breast cancer in one breast, a history of certain types of benign breast disease, and high levels of radiation exposure to the chest.[180]

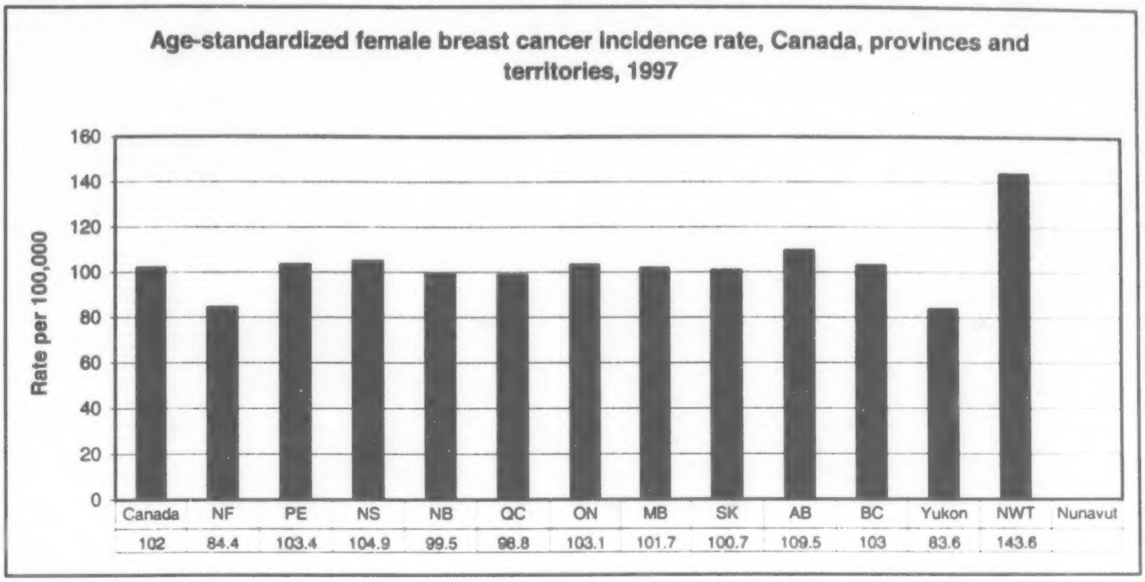
Other risk factors for developing breast cancer include obesity in post-menopausal women and various reproductive risk factors such as never having had children, being 30 years and older at first full-term pregnancy, having an early onset of menstruation, and a late onset of menopause.

Provincial/Territorial Comparisons

Among the provinces and territories, Saskatchewan has the fifth lowest age-standardized female breast cancer incidence rate (100.7) after the Yukon (83.6), Newfoundland (84.4), Quebec (98.8) and New Brunswick (99.5).

Changing patterns of age at birth of first child, as well as differing rates of implementation of screening mammography may contribute to provincial variations in breast cancer incidence rates. In addition, because some women will develop more than one primary breast cancer, some inter-provincial differences could be due to registries using different rules to count these multiple primaries. For example, Ontario and Quebec registries assign only one case of cancer of breast cancer to a woman in her lifetime, while other provinces permit registration of multiple primaries (in the same or opposite breast).[181]

Figure 94 Breast Cancer Incidence Rate: Provincial Comparison, 1997



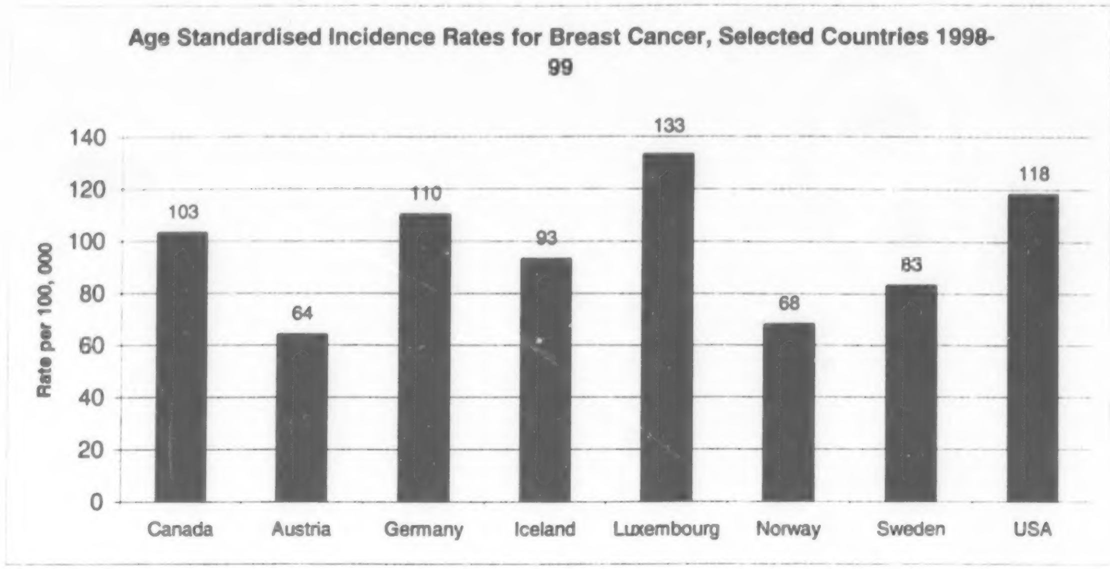
Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Note: Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count. Data from Nunavut was suppressed for reasons of confidentiality.

International Comparisons

Using data from the 2001 OECD report, incidence rates for breast cancer were seen to vary between countries reporting data for 1998 and 1999. Only those countries with data from a similar time period as the Canadian data are presented (as opposed to all 23 OECD countries). Data from later years were included if it represented the highest or lowest incidence rates of the international data set. Internationally, Canadian rates of newly diagnosed breast cancer (103 cases per 100,000) are similar to those reported in Germany (110 cases per 100,000) and lower than that found in the United States (118 cases per 100,000). The lowest incidence was recorded in Austria in 1998, with 64 women out of every 100,000 being diagnosed as having breast cancer.

Figure 95 Breast Cancer Incidence Rate: International Comparison



Source: Organization for Economic Cooperation and Development

Breast cancer incidence rates can be affected by several factors, including age, diet and screening practices. The fact that all cancers are significantly related to age means that in countries where a larger percentage of the population lives to an older age, the greater likelihood that higher cancer incidence rates are going to be reported. In Canada, absolute increases in cancer incidence rates have occurred primarily in the population aged 50 or over [196].

Although research into the dietary contributions to the development of cancer is still in preliminary stages, there is evidence linking dietary risk factors for the development of breast cancer with international variations in incidence rates. For example, research indicates that a higher intake of saturated fat from animal sources correlates with an increased risk of developing breast or colon cancer. Conversely, diets rich in fish and fish oils are being found to have a protective effect in terms of the risk of developing breast cancer [182]. This might help explain why the incidence of breast cancer in countries where fish contributes significantly to the average daily food intake, is somewhat reduced compared to other countries. The high intakes of meat and meat products in North American countries may also, therefore, be an example of a modifiable risk factor that contributes to the incidence rates of breast cancer.

Recent changes in breast cancer screening practice may also have affected the reported incidence of the disease [183]. The fact that Canada has had organized breast-screening programs in operation for several years at the provincial level may not only parallel the rise in the incidence of breast cancer that has been observed[184], but also may inflate Canadian age standardized incidence rates in comparison to other countries where less rigorous screening procedures are in operation.

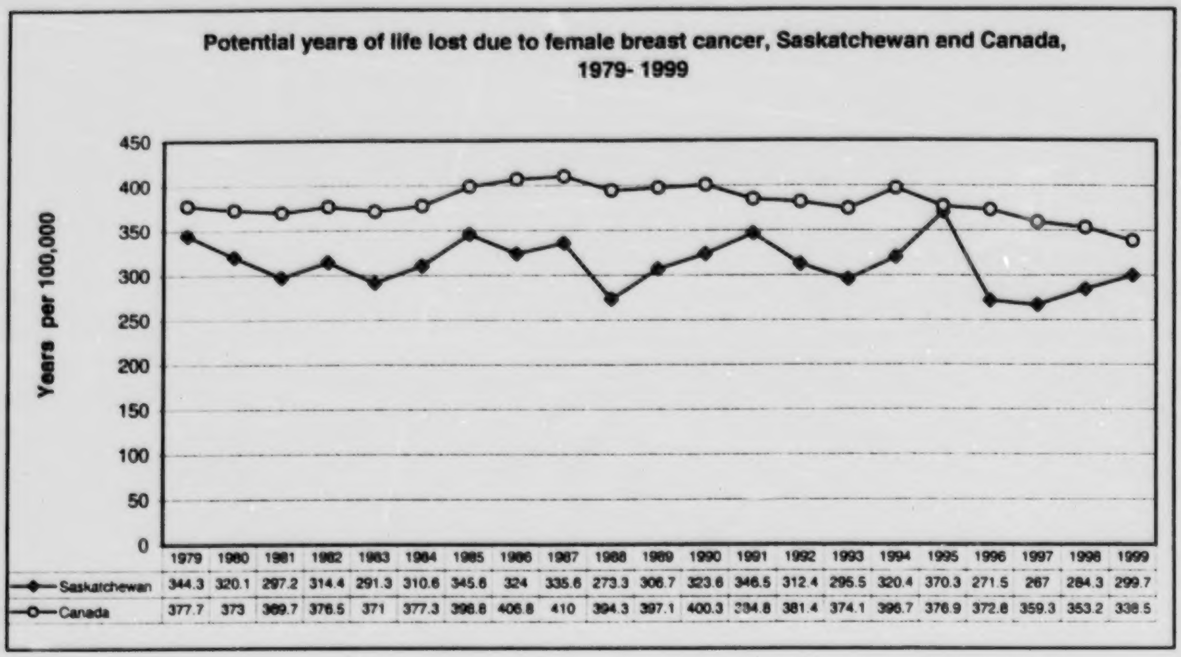
(b) Potential Years of Life Lost (PYLL)

Trend

Rates of premature death from cancer (i.e., prior to age 75) are represented by potential years of lost life (PYLL). PYLL can be used to highlight the significance of cancer types in terms of age of death. In terms of premature mortality from all cancer, the PYLL for breast cancer exceeds that of many cancers, (with the exception of lung cancer), reflecting the relatively young age at which women die of breast cancer. Overall, the PYLL rates for breast cancer in Saskatchewan have declined; however, this trend is marked by considerable fluctuations. In 1979, for every 100,000 females there was a PYLL of 344.3 years of life due to breast cancer. In 1989, the PYLL rate for breast cancer declined to 306.7 per 100,000 females. In the subsequent decade, there were further fluctuations with the highest PYLL rate reported in 1995 at 370.3 years per 100,000 females.

The national trend also showed a decline in the PYLL rates for breast cancer in the same 21-year period. In 1979, the national PYLL rate for breast cancer was 377.7 per 100,000 females and the rate declined by 10 per cent to 338.5 in 1999. Saskatchewan's rate of potential years of life lost (PYLL) due to breast cancer per 100,000 females was below the national rates for the entire time period. This means that Saskatchewan women have lost fewer years of life to premature death as compared to the national PYLL rate.

Figure 96 Breast Cancer PYLL: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Saskatchewan	344.3	320.1	297.2	314.4	291.3	310.6	345.6	324	335.6	273.3	306.7	323.6	346.5	312.4	295.5	320.4	370.3	271.5	267	284.3	299.7
○ Canada	377.7	373	369.7	376.5	371	377.3	398.8	406.8	410	394.3	397.1	400.3	384.8	381.4	374.1	398.7	376.9	372.8	359.3	353.2	338.5

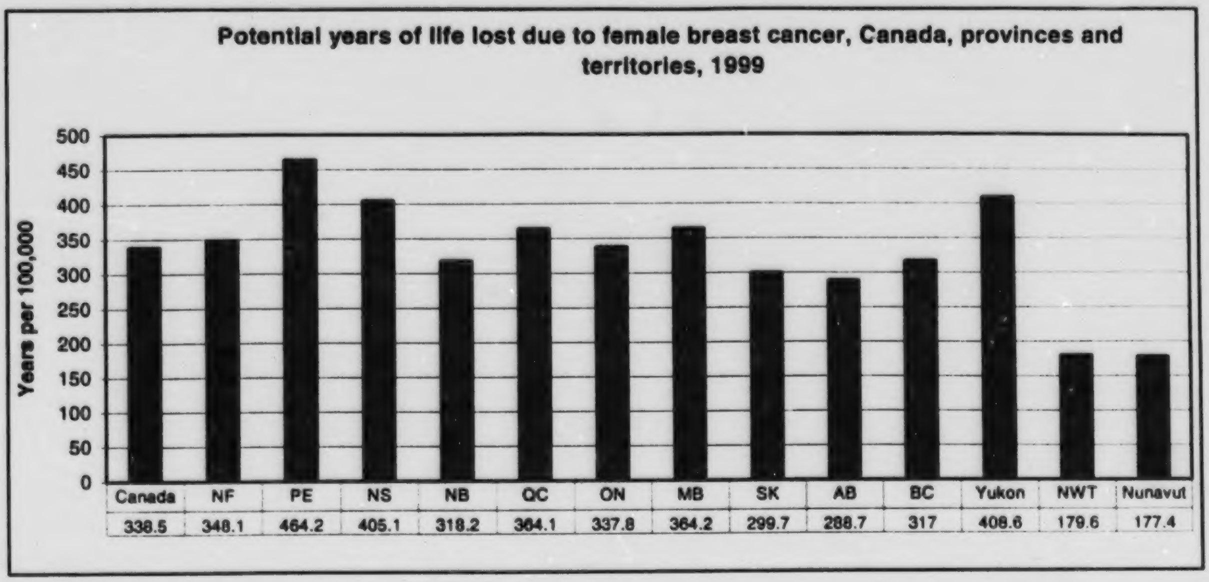
Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Provincial/Territorial Comparisons

Figure 97 highlights the PYLL rates for Canada, as well as each of the provinces and territories for 1999. Saskatchewan's PYLL for deaths due to breast cancer was 299.7 years.

r-3

Figure 97 Breast Cancer PYLL: Provincial Comparison, 1999



Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
338.5	348.1	464.2	405.1	318.2	364.1	337.8	364.2	299.7	288.7	317	408.6	179.6	177.4

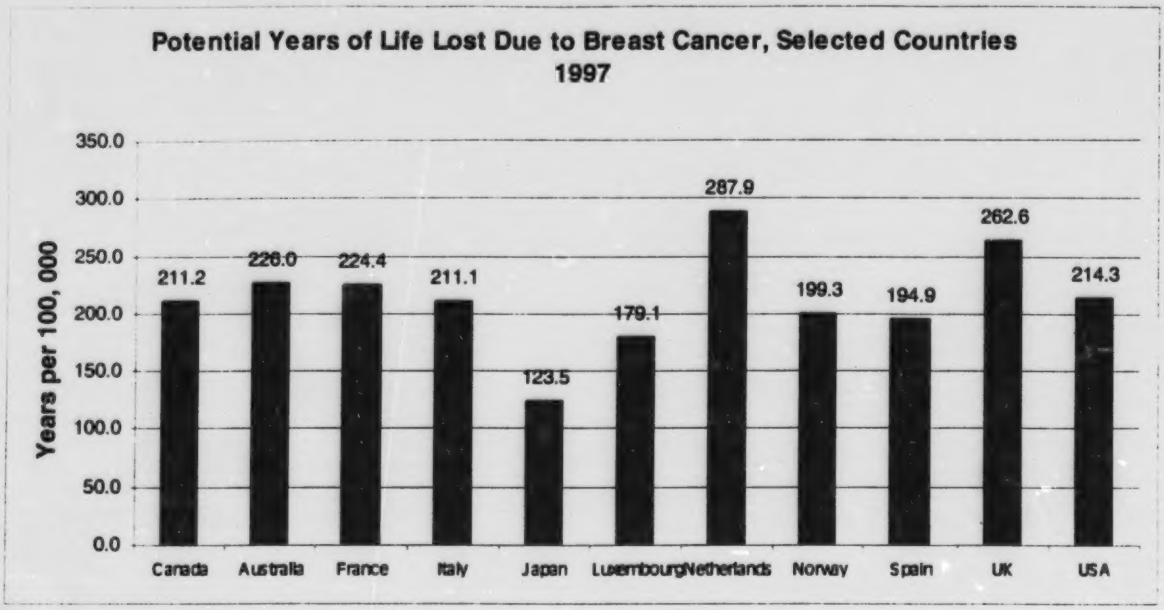
Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

__Note:__ Potential years of life lost for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

International Comparisons

The definition of potential years of life lost used with the international data (OECD 2001 report) are based on estimates of the potential years of life lost prior to age 70, not age 75 as is outlined earlier. Estimates for the potential years of life lost due to breast cancer per 100,000 of the population are provided.

Figure 98 Breast Cancer PYLL: International Comparison



Source: Organization for Economic Cooperation and Development

The rates of premature mortality from breast cancer in Canadian women (211.2 years per 100, 000) are comparable to several other countries, particularly the United States (214.3 years per 100, 000) and Italy (211.1 years per 100, 000). The highest rates of premature death from breast cancer were found in the Netherlands (287.9 years per 100, 000), and the United Kingdom (262.6 years per 100, 000) in the 1997-98 period.

The high rates of premature mortality due to breast cancer are one of the reasons that concerted efforts to promote early detection through screening have been made by several countries such as Canada, the United States and the UK. Early detection and treatment are factors that can reduce the likelihood of premature death due to breast cancer. Therefore, the screening procedures available in different countries are a likely factor in the rates of PYLL.

The lower rates of premature mortality observed for Japan (123.5 years per 100, 000) are perhaps reflective of the lower incidence rates observed in that country[203]. The exposure to modifiable risk factors that are important in disease incidence (i.e., diet and physical activity) may also play a role in the development of the disease progress and the subsequent premature death rates observed.

(c) Mortality Rate

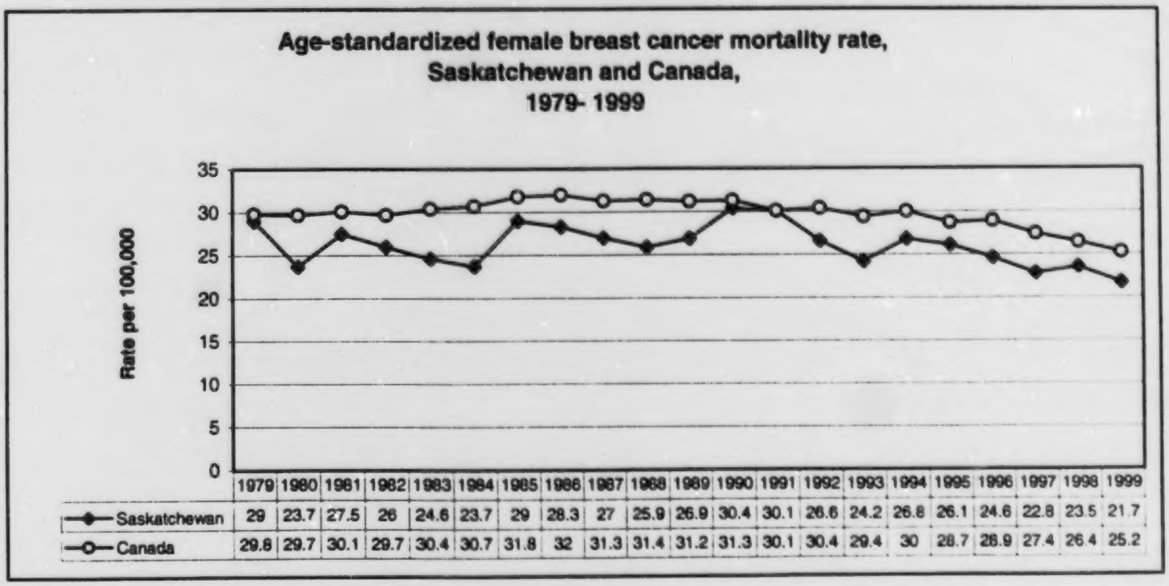
Trend

Saskatchewan's age-standardized deaths due to breast cancer declined between 1979 and 1999,from 29 to 26.9 deaths per 100,000 females and further declined to 21.7 deaths per 100,000 females in 1999.

The 1979-1999 period was also marked by fluctuations in the breast cancer mortality rate. For example, between 1980 and 1981, the rate increased from 23.7 to 27.5 deaths per 100,000 females. A similar increase was reported between 1989 and 1990 where the mortality rate increased from 26.9 to 30.4 deaths per 100,000 females.

Overall, there was a decline in the national age-standardized breast cancer mortality rate in the 1979- 1999 period. However, like Saskatchewan, the national mortality rates between 1979 and 1999 were marked by fluctuations. The mortality rates remained relatively stable at around 29.8 to 32.8 deaths per 100,000 females between 1979 and 1994. Between 1994 and 1999, the rate declined from 30 to 25.2 deaths per 100,000 females. It is suspected that improved breast cancer screening procedures may have contributed to this decline in mortality rates.

Figure 99 Breast Cancer Mortality Rate: Saskatchewan Trend, 1979-99



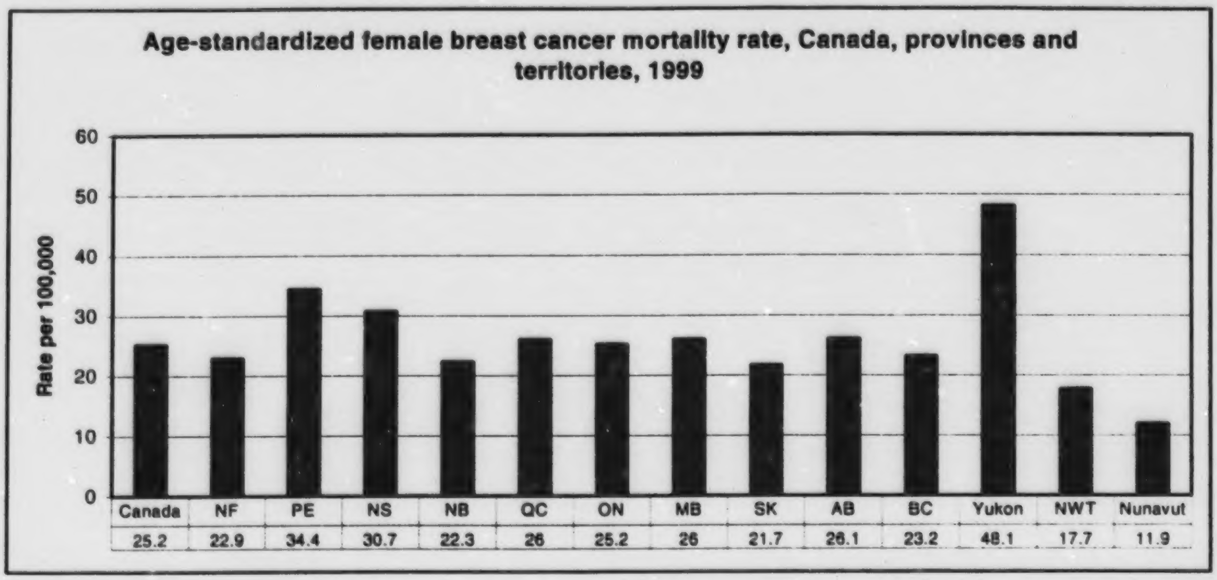
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Saskatchewan	29	23.7	27.5	26	24.6	23.7	29	28.3	27	25.9	26.9	30.4	30.1	26.6	24.2	26.8	26.1	24.6	22.8	23.5	21.7
—○— Canada	29.8	29.7	30.1	29.7	30.4	30.7	31.8	32	31.3	31.4	31.2	31.3	30.1	30.4	29.4	30	28.7	28.9	27.4	26.4	25.2

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Provincial/Territorial Comparisons

In 1999, Saskatchewan had the third lowest (21.7) age-standardized female breast cancer mortality rate in the country after Nunavat (11.9) and the Northwest Territories (17.7) (Figure 100). Low rates in the north, especially in the territories, may be related to higher proportions of Aboriginal people, who generally have reduced incidence of breast cancer.[185]

Figure 100 Breast Cancer Mortality Rate: Provincial Comparison, 1999



Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Note: Age-standardized mortality rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

International Comparisons

Although other international datasets are available for comparison (e.g., WHO International Agency for Research on Cancer - IARC), the estimates provided by the OECD Health Data 2001 report on age-standardized death rates are used here. This data set provides the most complete, and contemporary information, and is standardized against a population that is similar to the Canadian standard population used for Federal/ Provincial/ Territorial reporting.

Estimated mortality rates are based on the number of deaths according to sex and selected causes as provided by the World Health Organization, then the age standardized death rates per 100, 000 of the population are calculated by the OECD secretariat. The total population for 1980 is used as a reference for standardisation. For further information, details on the coverage and reliability of cause-of-death estimates are regularly published in the World Health Statistics Annual.

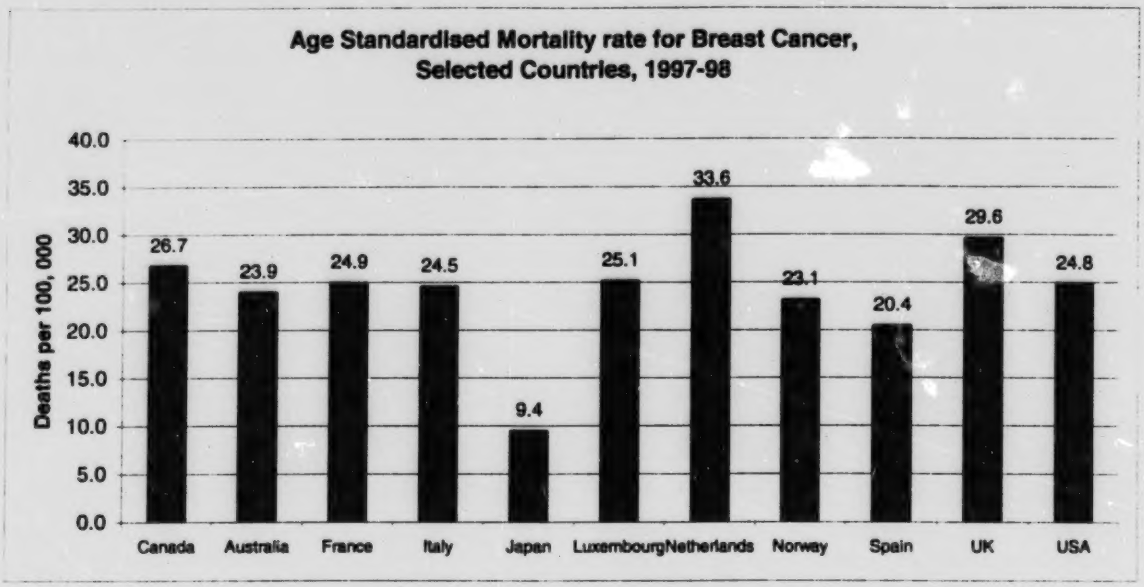
The OECD population for 1980, used for calculating age-standardized mortality rates is presented below. It should be noted that this table is different from the new WHO standard population that appears in the latest edition (1997-1999 online version) of the World Health Statistics Annual.

Age group (years)	OECD, 100's
0	140,699
1-4	547,645
5-9	700,764
10-14	719,340
15-19	741,611
20-24	710,404
25-29	676,832
30-34	660,553
35-39	546,359
40-44	505,176
45-49	481,914
50-54	473,148
55-59	440,361
60-64	337,337
65-69	336,354
70-74	275,245
75-79	196,186
80-84	106,742
85+	66,340
Total/totale	8,662,980

Estimates in this section are based on the OECD Health data 2001 report on age-standardized death rates. The age standardized mortality rates are a useful benchmark from which Canadian data can be evaluated with reference to international standards, as they control for the differences in the age structure of the population. Cause of death information is based on reports provided at the registration of death, therefore, a requirement of good quality information is that death registration be near universal, and that the cause-of-death be reported routinely on the death record so determination of cause of death according to the International Classification of Diseases can be made. Therefore, inter-country comparisons should be interpreted with caution, as it is likely that differences exist in the completeness of death registration coverage.

The estimates presented below represent the most recent data available for selected countries. Only those countries with data from a similar time period as was the Canadian data (i.e., 1997) are presented (as opposed to all 23 OECD countries). Data from later years (e.g., 1998) were included if they represented the highest or lowest mortality rates of the international data set.

Figure 101 Breast Cancer Mortality Rate: International Comparison



Source: Organization for Economic Cooperation and Development

The mortality rates due to breast cancer experienced by Canadian women (26.7 deaths per 100, 000) are very similar to those observed in other countries, such as Luxembourg, (25.1 deaths per 100, 000), France (24.9 deaths per 100, 000), the USA (24.8 deaths per 100, 000) and Italy (24.5 deaths per 100, 000). Although the UK exhibits the highest mortality rate (29.6 deaths per 100, 000) after the Netherlands (33.6 deaths per 100, 000) there is some indication that this rate has steadily declined since the 1950s as it has in Canada, the USA and Australia [186].

The lowest rate of deaths due to breast cancer was reported in Japan in 1997, where only 9.4 deaths per 100, 000 were recorded. In trying to account for these international differences reference can be made to the availability of, and the completeness of screening programs for breast cancer. Whether it is differences in screening, the availability of improved treatments in different countries, or environmental and social conditions, remains to be clarified. Aggressive treatment programs with an emphasis on early detection, quicker access to treatment, and easier access to expensive chemotherapy and drugs have been highlighted in UK research as being the reason that mortality rates from breast cancer are lower in the USA than they are in the UK [187].

Furthermore, some consideration must be given to the presence of risk, or protective factors that are likely to vary on an international basis. Certain dietary behaviours, such as the consumption of high amounts of dietary fat, have been linked to the development of certain cancers[188]. Interestingly, the lower rates of breast cancer in Japan coincide with the consumption of a low animal product (meat and dairy) diet, and a higher intake of soy-based products, which have been indicated in some research as providing preventative benefits [189].

Conclusive evidence of specific dietary risk factors for breast cancer requires further research, as separating out the effects of specific dietary elements and their relationship to breast cancer is not easy. The fact that exposure to diet and life-style risk factors is likely to occur in combination makes causal connections difficult. Furthermore, identifying the specific components in a food that are responsible for a detrimental, or positive effect on health requires much refinement. International differences in diet and lifestyle factors, however, remain a plausible avenue for future research.

(d) Relative Survival Rate

Relative survival rates represent the ratio of observed survival in the group of cancer patients and survival that would be expected had they been only subjected to the mortality rates of the general population with similar characteristics such as age, sex, and geographic location. The time period over which relative survival rates have been considered in this document is five-years.

Trend

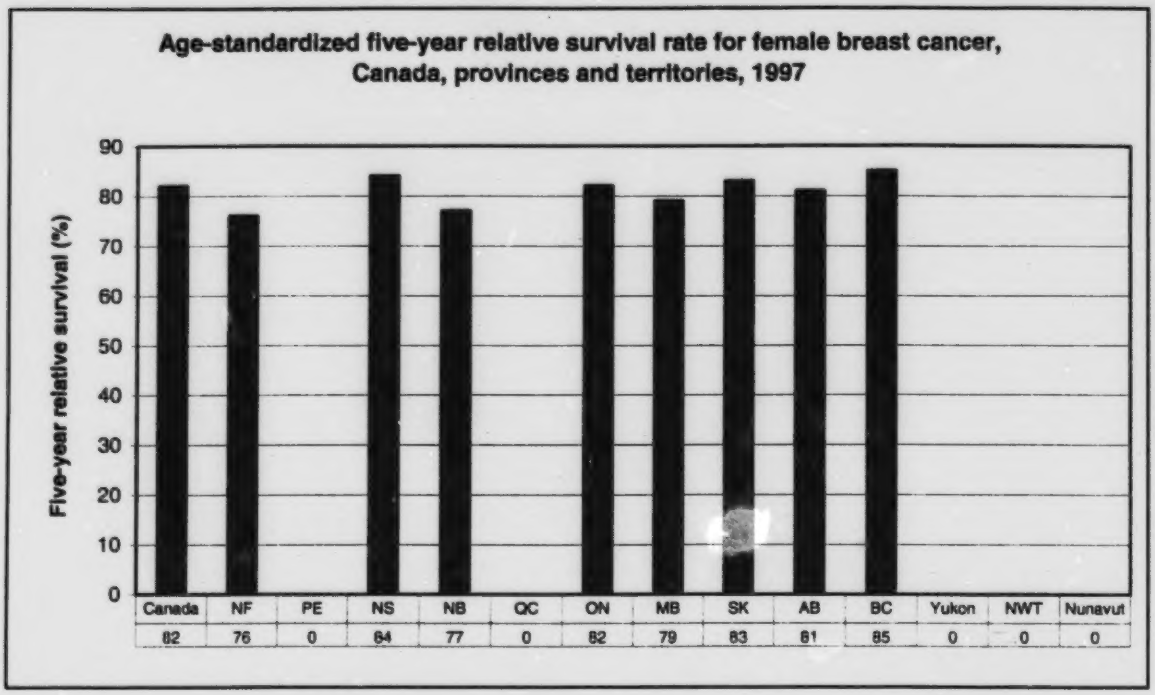
Saskatchewan had the third highest (83 per cent) age-standardized relative survival rate for female breast cancer in Canada. This means that a Saskatchewan woman aged between 15 and 99 diagnosed with breast cancer in 1992 had a five-year relative survival rate of 83 per cent, or an 83% chance of living another five years.

Provincial/Territorial Comparisons

British Columbia had the highest age-standardized relative survival rate for female breast cancer at 85 per cent. These provincial variations may be partly explained by the use of mammography for early diagnosis. For example, according to the 1996/97 National Population Health Survey, the proportion of women aged 50 to 69 who reported having received a screening mammogram within the previous two years was also highest in British Columbia (57 per cent).

In general, longer survival times mean either through more effective screening programs breast cancer is being diagnosed at an earlier stage (and is thereby more easily treated), or patients with cancer are living longer as the result of better treatment.[190]

Figure 102 Breast Cancer Relative Survival Rate: Provincial Comparison, 1997



Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
82	76	0	84	77	0	82	79	83	81	85	0	0	0

Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian and provincial life tables (1990-1992); ISQ

Note: Quebec data were not included in the national estimates of five-year relative survival because their method of ascertaining the data of diagnosis of cancer differs substantially from that of other provincial cancer registries. Results for Prince Edward Island, the Yukon Territory, the Northwest Territories and Nunavut are not shown because of an insufficient number of cases for analysis. Cases from them, however, are included in the national estimates.

International Comparisons

There is no comparable data currently available for international comparisons of relative survival rates for breast cancer.

4.4 Prostate Cancer

All references to prostate cancer are based on the definition provided by the Ninth Revision of the International Classification of Diseases (ICD-9). Prostate cancer is defined as a malignant neoplasm of the prostate (185).

(a) Incidence rate

Trend

Between 1976 and 1993, the incidence rates of prostate cancer in Saskatchewan and Canada were on the rise. Incidence rates peaked in 1993 for Saskatchewan and Canada (154.6 and 140.4 respectively), then declined until 1995 when they plateau over the next couple of years. Overall, however, the incidence of prostate cancer on a national and provincial basis has increased incrementally from 1976 to 1997.

Prostate cancer is the most commonly diagnosed cancer among Canadian men, excluding non-melanoma skin cancer[191], and appears to be on the increase. Since little is known about the causation of prostate cancer, this escalation may be due in part to the use of more sensitive screening procedures, increased exposure to risk factors, and/or as an artifact of an increasing population at risk.

Since prostate cancer is often symptomless in its initial stages, improvements in screening procedures using non-invasive methods of blood testing men for prostate-specific antigen (PSA), allows for the earlier detection of localised cancers. Although the rising incidence has been observed for many years, the dramatic increase that has occurred in more recent years has primarily been attributed to earlier detection[192].

Furthermore, the use of PSA tests which are less invasive than other diagnostic tests such as the digital rectal examination (DRE), and transrectal ultrasound (TRUS) may encourage more men to partake in screening initiatives than before.

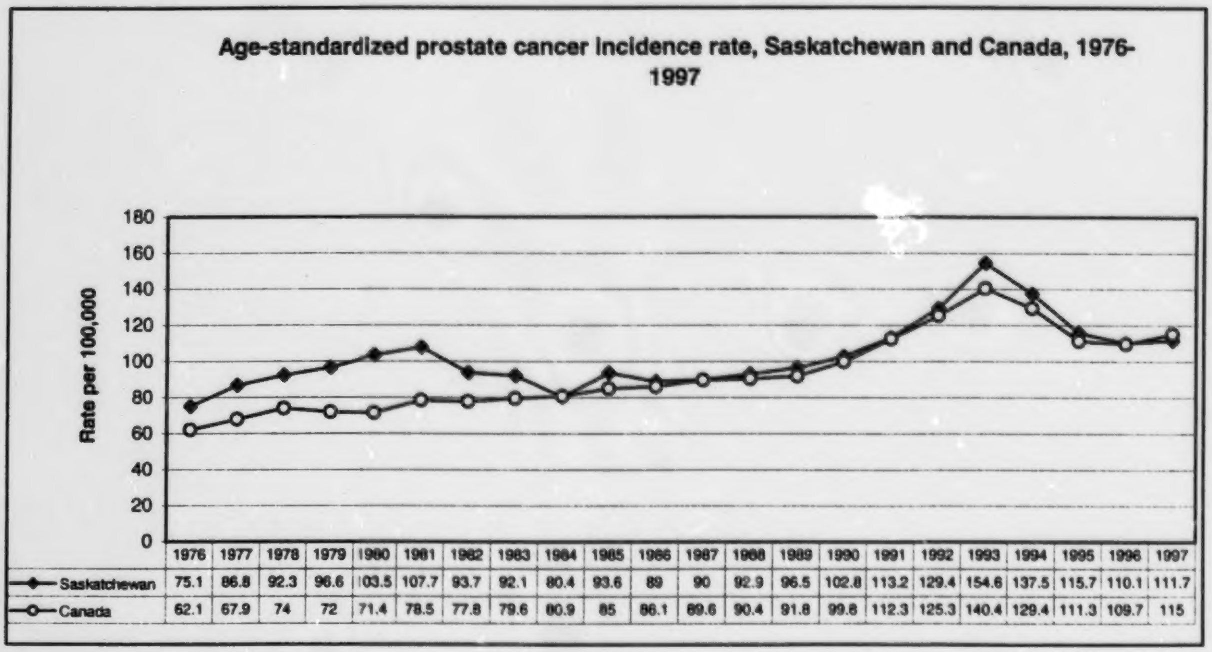
There is debate concerning the appropriateness of using these tests as screening modalities in asymptomatic men, mainly because it is not known if early detection can actually influence the natural progression and outcome of the disease. Furthermore, incidence rates can be affected by the detection of latent cancer, which may never become active. An estimated 90% of cases may remain clinically unimportant for decades [193], yet when these cancers are detected incidentally they are recorded as stage A disease and contribute to the calculation of incidence rates [194].

If earlier detection does play a role in the increasing incidence rates observed at the national and provincial levels it may be partly due to heightened levels of health awareness and a greater tendency for men to routinely visit general practitioners or for investigation earlier in the natural progression of the disease.

While prostate cancer is very rare among Canadian males under the age of 45, its incidence rises faster with age than for any other major cancer [195]. Therefore, apart from earlier detection, simply increasing numbers of elderly men within the population can contribute the increase in the absolute number of cases recorded. It has been estimated that the annual incidence of prostate cancer will continue to rise to an estimated number of 35,200 cases by the year 2016, and that about half of this projected increase will be due to the larger numbers of older men in the population [210].

It remains possible, however, that incidence rates remains in part due to an increased exposure to an as yet unknown causal agent. Future work is required to understand the role that lifestyle and exposure to hypothesised risk factors have to play in the incidence rates of prostate cancer in Canada.

Figure 103 Prostate Cancer Incidence Rate: Saskatchewan Trend, 1976-97



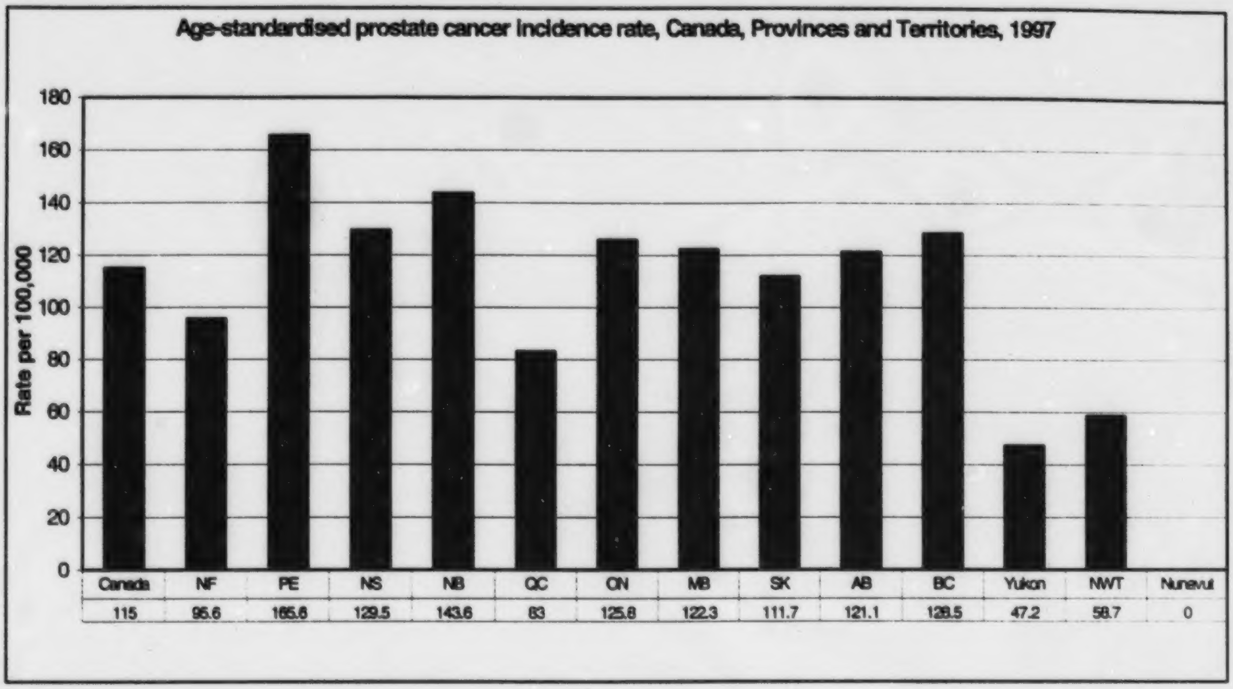
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Saskatchewan	75.1	86.8	92.3	96.6	103.5	107.7	93.7	92.1	80.4	93.6	89	90	92.9	96.5	102.8	113.2	129.4	154.6	137.5	115.7	110.1	111.7
Canada	62.1	67.9	74	72	71.4	78.5	77.8	79.6	80.9	85	86.1	89.6	90.4	91.8	99.8	112.3	125.3	140.4	129.4	111.3	109.7	115

Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Provincial/Territorial Comparisons

Age standardized incidence rates allow inter-provincial comparisons to be made as they control for differences in the age structure of the population. This is important with reference to the incidence rates of prostate cancer since the occurrence of this disease rises faster with age than for any other major cancer. Consequently, provinces in which older men make up a substantial proportion of the population would produce higher incidence rates than those provinces with slightly younger demographic profiles.

Figure 104 Prostate Cancer Incidence Rate: Provincial Comparison, 1997



Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
115	95.6	165.6	129.5	143.6	83	125.8	122.3	111.7	121.1	128.5	47.2	58.7	0

Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Note: Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

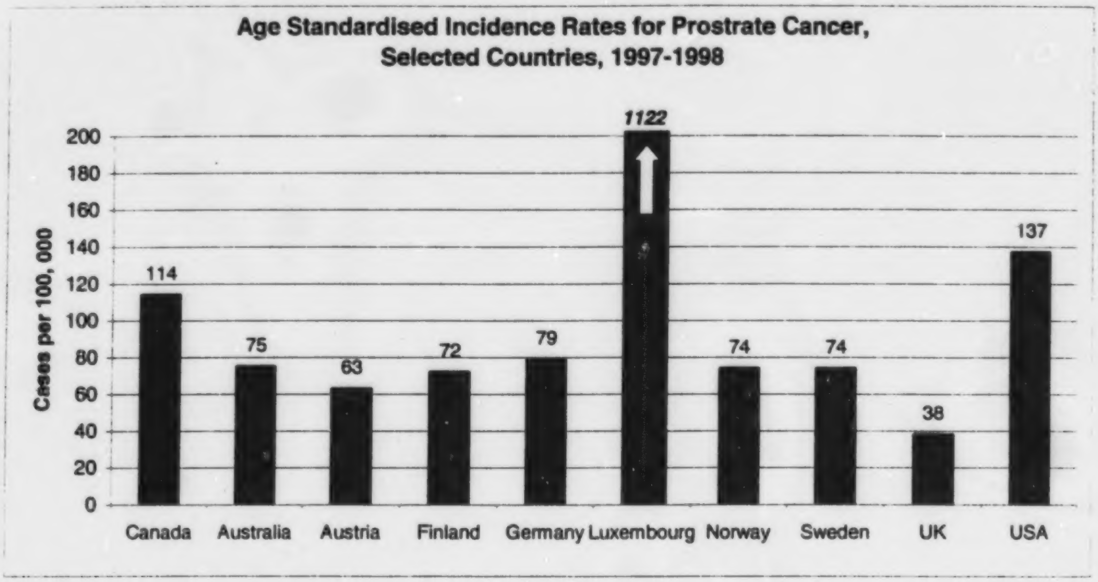
The incidence rate of prostate cancer for Saskatchewan men (111.7) is similar to the national average (115.0). With the exception of the Yukon, Northwest Territories and Nunavut, where incidence rates are comparably low, possibly due to small population sizes, the lowest rate provincially is found in Quebec (83.0).

Inter-provincial differences could possibly be due to regional variations in screening techniques and the establishment of early detection programs, as well as regional variations in the prevalence of risk factors. Risk factors include diet and other lifestyle factors such as cigarette and alcohol consumption. Evidence of dietary contributions to prostate cancer have come from international studies where rising incidence rates have been recorded in countries that have experienced dramatic dietary changes in recent decades, such as Japan [196]. The main component highlighted as being responsible for these changes is dietary fat, especially high intakes of animal and saturated fat, which has shown strong positive correlations with prostate cancer incidence both within and between different countries.

International Comparisons

Select data from the OECD 2001 report provide comparable estimates for countries similar to Canada in terms of standard of living. Only those countries with data from a similar time period as the Canadian data are presented (as opposed to all 23 OECD countries). Data from later years were included if it represented the highest or lowest incidence rates of the international data set.

Figure 105 Prostate Cancer Incidence Rate: International Comparison



Source: Organization for Economic Cooperation and Development

Prostate cancer is the leading form of cancer incidence in men in Canada. The rapid increase in the number of prostate cancers detected in all provinces a few years ago resulted from the widespread rise in the use of earlier detection techniques (Canadian Cancer Statistics, 2001). Therefore comparisons to several other countries in the same time frame must be viewed with caution. The low incidence rate reported in the UK (38 cases per 100, 000) may in fact be explained by these differences in screening practices. Other differences that may help explain the variation in international estimates are related to the average life expectancy of the population.

The incidence rates for prostate cancer in Luxembourg (1122 cases per 100,000) far exceed those reported by other countries, and are possibly reflective of cultural differences in reporting, diagnosis and screening procedures. Although rates of newly diagnosed prostate cancer are not nearly as high in Canada as they are in Luxembourg, they still reflect the fact that prostate cancer remains a significant health issue for Canadian men.

(b) Potential Years of Life Lost (PYLL)

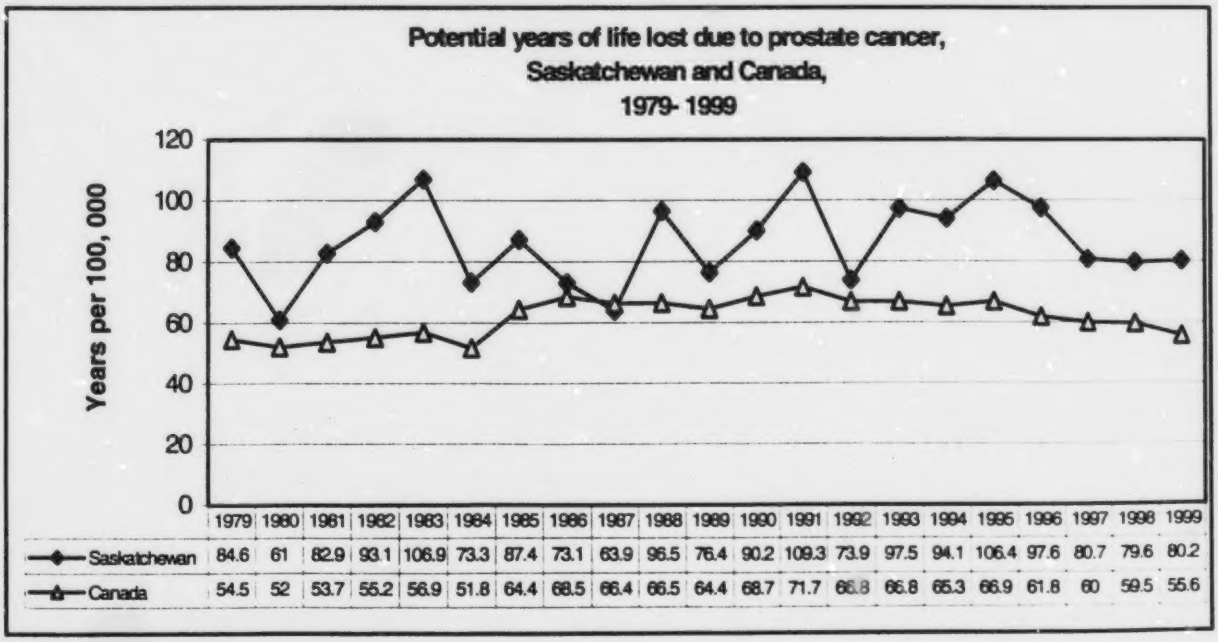
Trend

The potential years of life lost (PYLL) provides an indication of the burden placed on a population by the premature death of its inhabitants. As such this indicator gives more importance to the causes of death that occur at younger ages than those occurring at older ages. All deaths prior to age 75 as a result of prostate cancer are represented in the PYLL estimate as the rate of years of life lost per every 100, 000 of the male population.

Trends in the premature mortality rate over time are slightly different at the national level compared to that observed for Saskatchewan in the same time period (1979-99). The Canadian rate has remained fairly stable over time, although the PYLL increased between 1984 (51.8 years per 100, 000) and 1985 (64.4 years per 100, 000), remained around that level for approximately ten years, and has been decreasing since 1996. The PYLL rate reported in 1999 (55.6 years per 100,000) is similar to that reported in 1979 (54.5 years per 100, 000).

On a provincial basis, however, larger fluctuations in the PYLL rates for prostate cancer have been observed. These rates have remained consistently higher than the national rate with the exception of 1987 (63.9 and 66.4 years per 100,000 for Saskatchewan and Canada respectively). The PYLL rate in 1999 (80.2 years per 100,000) is only slightly lower than that in 1979 (84.6 years per 100,000).

Figure 106 Prostate Cancer PYLL: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Saskatchewan	84.6	61	82.9	93.1	106.9	73.3	87.4	73.1	63.9	96.5	76.4	90.2	109.3	73.9	97.5	94.1	106.4	97.6	80.7	79.6	80.2
△ Canada	54.5	52	53.7	55.2	56.9	51.8	64.4	68.5	66.4	66.5	64.4	68.7	71.7	66.8	66.8	65.3	66.9	61.8	60	59.5	55.6

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

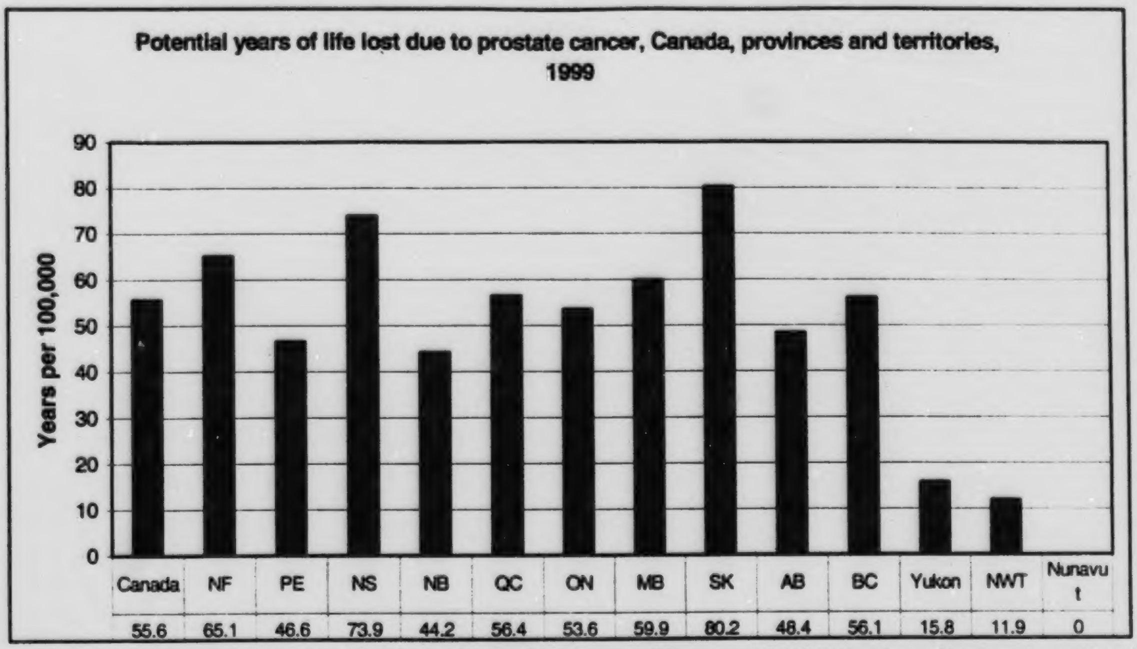
Provincial/Territorial Comparisons

Saskatchewan men appear to have a higher rate of premature mortality from prostate cancer than that found for any other province in Canada. Excluding the PYLL rates recorded for the Yukon, NWT and Nunavut, the lowest rate of premature mortality due to prostate cancer was found in New Brunswick (44.2 years per 100, 000), which is considerably lower than the national average (55.6 years per 100, 000).

In comparison to the national average (55.6 years per 100, 000) there appears to be some degree of provincial variation in the rates of PYLL. These differences likely reflect variability in the availability and usage of screening programs provided on a provincial basis. Early detection and treatment may be responsible for some the differences in premature mortality due to prostate cancer observed here.

However, much debate remains as to the effectiveness of early detection and therapy in reducing premature mortality from prostate cancer. The Canadian Task Force on the Periodic Health Examination does not at present recommend the routine use of PSA testing as part of routine health exams in men who are at low risk of developing the disease (based on age, genetic and familial history). This recommendation is the result of the absence of clinical evidence for the effectiveness of aggressive detection procedures, the poor predictive value of screening tests, which often misclassify latent benign tumours as active disease, and the adverse effects associated with such early treatment procedures. Furthermore, the recommendation reflects the ethical requirement that any early detection procedures must be proven to result in more good than harm before they become a commonplace procedure in a routine health exam [197]. Therefore, although provincial differences exist in the rates of premature mortality recorded from prostate cancer in men, debate remains as to the exact contribution that early screening and treatment has in reducing the potential years of life lost due to this disease.

Figure 107 Prostate Cancer PYLL: Provincial Comparison, 1999



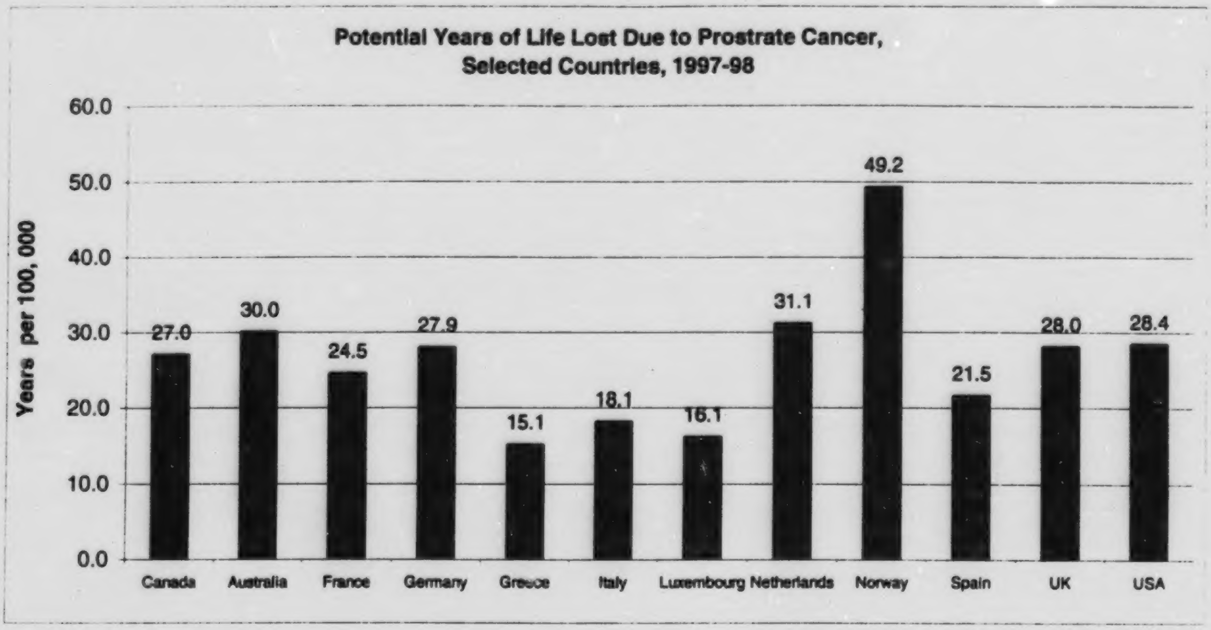
Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Note: Potential years of life lost for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

International Comparisons

International comparisons of PYLL rates for prostate cancer rely on data from comparable country estimates in the OECD 2001 report. This international data is based on estimates of the potential years of lost life prior to age 70, not age 75 as is outlined in the Canadian indicator data. Only those countries with data from a similar time period as the Canadian data are presented (as opposed to all 23 OECD countries). Data from later years were included if it represented the highest or lowest PYLL rates of the international data set.

Figure 108 Prostate Cancer PYLL: International Comparison



Source: Organization for Economic Cooperation and Development

Prostate cancer is one of the three leading causes of premature death due to cancer. The age at which men die from prostate cancer is somewhat higher than that experienced for other types of cancer, reflecting the later age of onset. Although prostate cancer is more common in men than lung cancer, the PYLL due to lung cancer is four times that due to prostate cancer [221]. While recent data shows a trend towards increasing incidence rates of prostate cancer, there is some evidence that part of this may be due to increased detection of localised cancers through blood testing of men for prostate-specific antigen (PSA). Rates of premature death due to prostate cancer in Canada are maintained at levels lower than are observed for many other countries, such as Norway, the Netherlands and Australia. Indeed, the Canadian rates of PYLL due to prostate cancer (27.0 years per 100,000) are similar to those found in Germany (27.9 years per 100, 000), the UK (28.0 years per 100,000) and the USA (28.4 years per 100,000).

The highest rates of PYLL are recorded for Norway where it is estimated that 49.2 years per 100, 000 were lost due to prostate cancer in 1997. Greece had the lowest rate of premature mortality due to prostate cancer with 15.1 years per 100, 000 recorded for the same year.

Differences between countries in PYLL rates are difficult to explain. However, recent studies have shown that migrant populations tend to follow a prostate cancer risk pattern similar to that of their host country. This pattern is strongly suggestive of a large role played by environmental factors in terms of the contribution to the differences found between countries[198].

Evidence supporting the role of diet in prostate cancer development has increased over the last decade, The lower rates of premature mortality due to prostate cancer found in Greece and Italy, for example, may therefore be due to the preventative benefits of a Mediterranean diet that is naturally low in saturated animal fats.

Evidence as to the underlying reasons for these differences between countries in PYLL due to prostate cancer is still limited, however, it would appear that the rates presented here for Canada are not dissimilar to those found in several other countries.

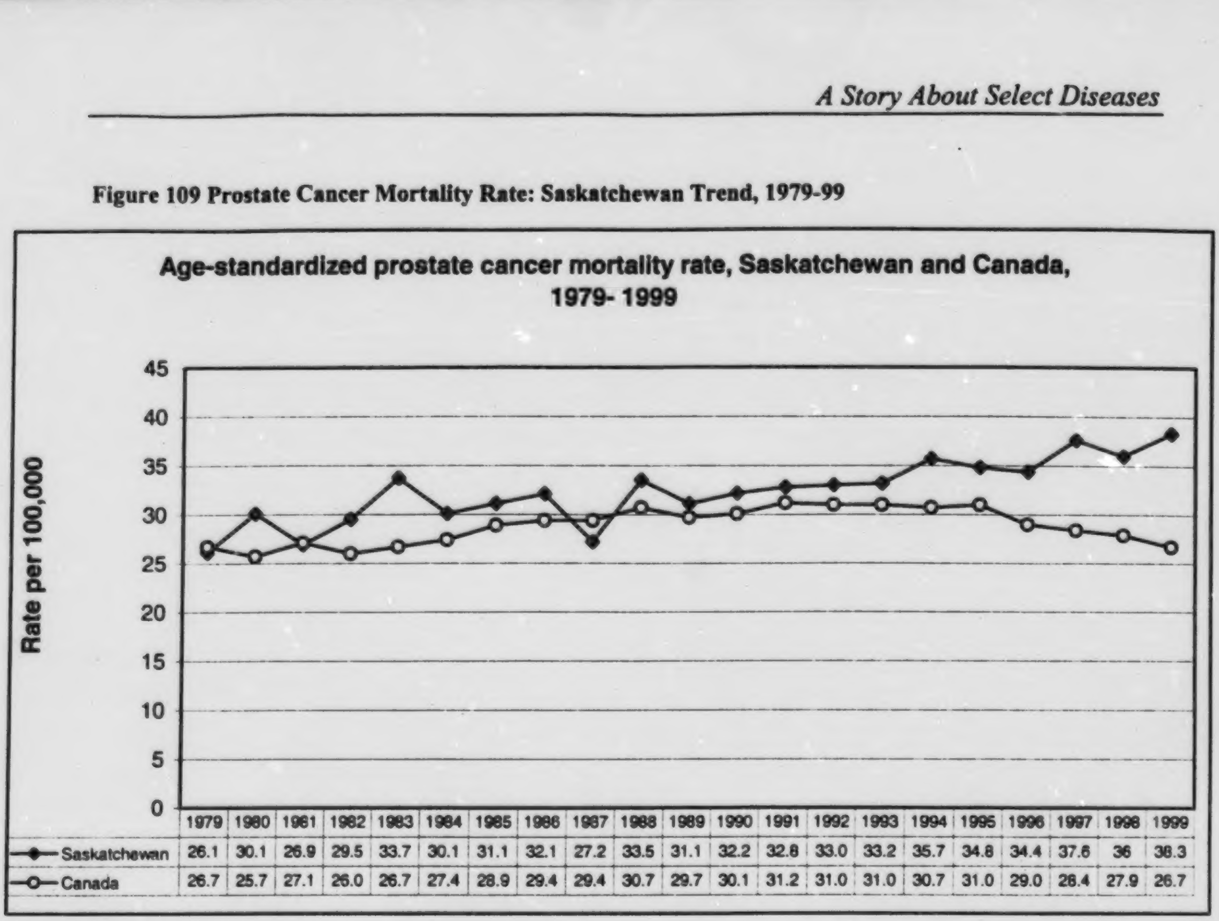
(c) Mortality Rate

Trend

In comparison to the trends observed for premature mortality rates, the age-standardized death rates from prostate cancer have remained stable at both the national and provincial levels. The Canadian average was the same in 1999 as it was in 1979 (26.7 deaths per 100,000

Within Saskatchewan, however, the mortality rate due to prostate cancer increased between 1979 and 1999 from a low of 26.1 deaths per 100,000 in 1979, to a high of 38.3 deaths per 100,000 in 1999. Mortality rates for Saskatchewan men fluctuated in the first decade of analysis and rose steadily in the last ten years. Furthermore, the death rate from prostate cancer in Saskatchewan was similar to the national average until 1996 when the national mortality rate from prostate cancer continued to fall and the Saskatchewan rate continued to rise.

Figure 109 Prostate Cancer Mortality Rate: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Saskatchewan	26.1	30.1	26.9	29.5	33.7	30.1	31.1	32.1	27.2	33.5	31.1	32.2	32.8	33.0	33.2	35.7	34.8	34.4	37.6	36	38.3
Canada	26.7	25.7	27.1	26.0	26.7	27.4	28.9	29.4	29.4	30.7	29.7	30.1	31.2	31.0	31.0	30.7	31.0	29.0	28.4	27.9	26.7

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

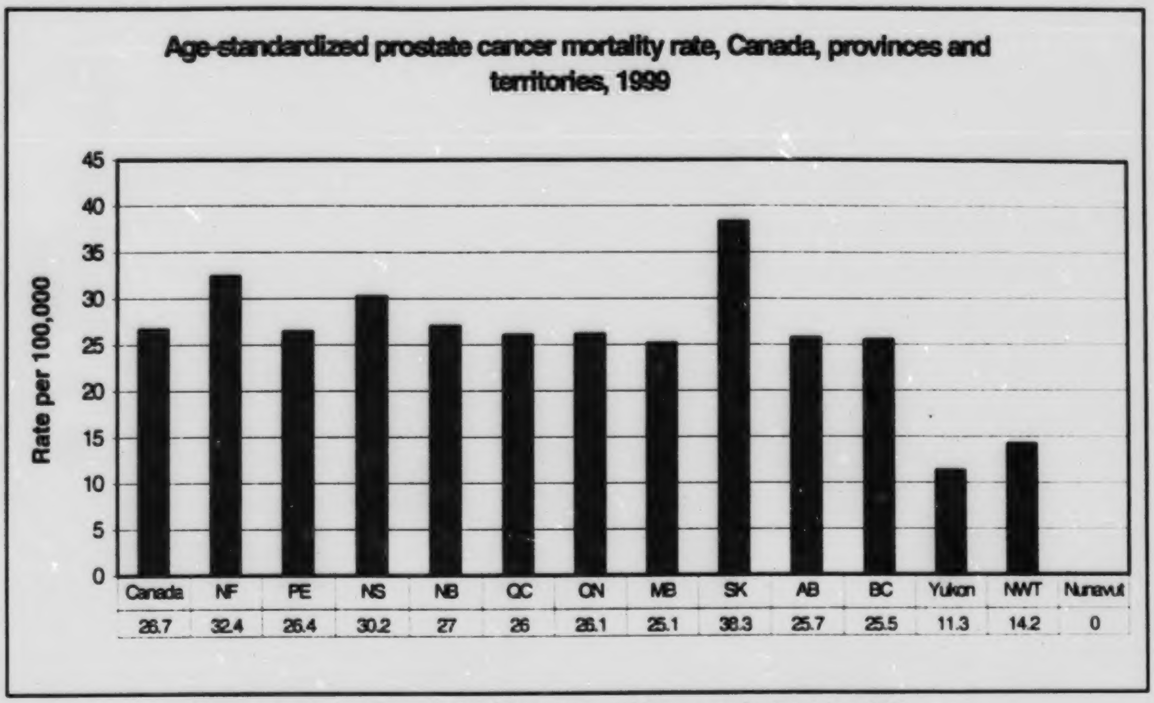
Provincial/Territorial Comparisons

As was found with the premature mortality rate from prostate cancer (PYLL), the death rate for Saskatchewan men (38.3 deaths per 100, 000) is higher than that observed for any other province.

Since modifiable risk factors have not been clearly established, the provincial differences presented here may be partly due to variations in the use of early detection measures to control the disease. At present there is no agreement in Canada on the appropriateness of screening for prostate cancer using the sensitive prostate-specific antigen (PSA) test, which although leading to an increase in reported incidence rates, has not been consistently shown to decrease mortality rates.

As mentioned earlier, the Canadian Task Force on the Periodic Health Examination (1994) does not recommend the routine use of PSA as part of a periodic health examination; therefore, early screening procedures are left to the discretion of individual physicians acting upon provincial guidelines [199]. The Health Services Utilisation and Research Commission (HSURC) issued guidelines in 1995, to all family physicians and urologists in Saskatchewan, stating that they should not use the PSA test to screen men without signs or symptoms of prostate cancer [200].

Figure 110 Prostate Cancer Mortality Rate: Provincial Comparison, 1999



Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Note: Age-standardized mortality rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

Differences in exposure to modifiable risk factors may contribute to the observed mortality rates. As previously mentioned, there is evidence that diet may make some contribution to regional variations in prostate cancer incidence and mortality. High intakes of dietary fat, specifically from animal and saturated sources, have a positive association with disease mortality, although its relationship to prostate cancer development has not been fully determined. There is some support for the role high fat intakes have on hormone levels in the blood and tissues.[217]

International Comparisons

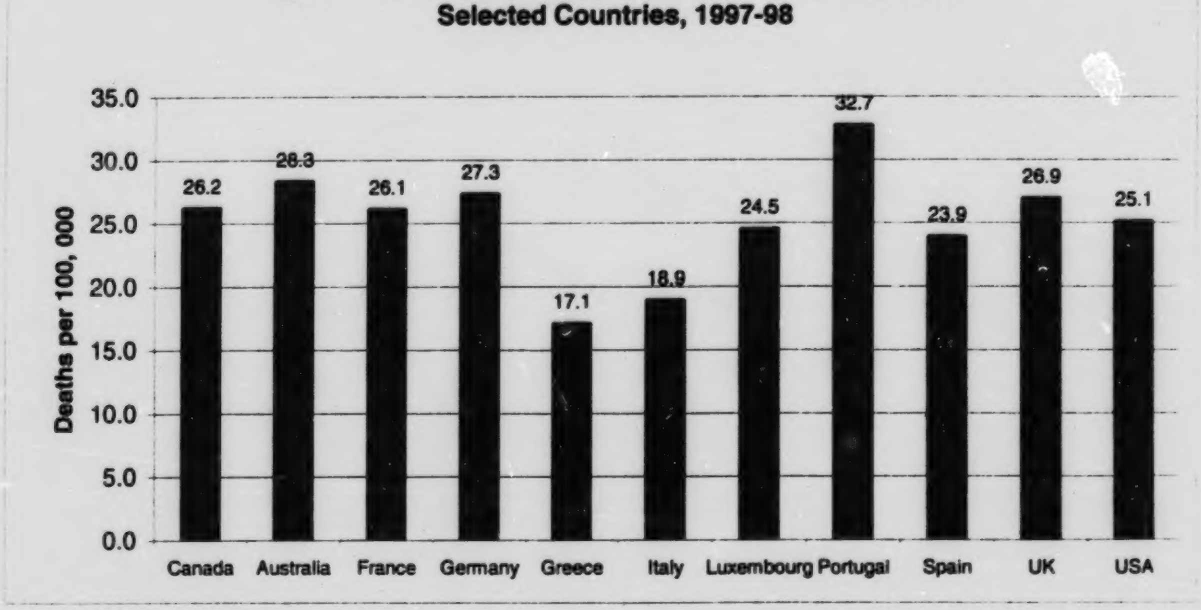
Cause of death information is based on reports provided at the registration of death, therefore, a requirement of good quality information is that death registration be near universal, and that the cause-of-death be reported routinely on the death record, so determination of cause of death according to the International Classification of Diseases can be made. Therefore, inter-country comparisons should be interpreted with caution, as it is likely that differences exist in the completeness of death registration coverage.

The OECD population used for calculating age- standardized mortality rates is presented in the international comparisons section on breast cancer.

Estimates in this section are based on the OECD Health data 2001 report on age-standardized death rates. The age standardized mortality rates are a useful benchmark from which Canadian data can be evaluated with reference to international standards, as they control for the differences in the age structure of the population.

The estimates presented below represent the most recent year of data available for selected countries. Only those countries with data from a similar time period as the Canadian data (i.e., 1997) are presented (as opposed to all 23 OECD countries). Data from later years (1998) were included if it was considered if they represented the highest or lowest mortality rates of the international data set.

Figure 111 Prostate Cancer Mortality Rate: International Comparison



Source: Organization for Economic Cooperation and Development

Prostate cancer is the second leading cause of cancer death, after lung cancer, in Canadian men aged 65 and older [201]. Yet prostate cancer mortality rates appear to vary from country to country.

Figure 111 highlights the similarity in Canadian rates of mortality due to prostate cancer to those found in several other countries. For example, the mortality rates reported in France and the UK were 26.1 and 26.9 deaths per 100, 000 respectively. The highest recorded mortality rate for prostate cancer was recorded in Portugal at 32.7 deaths per 100, 000, and the lowest being found in Greece at 17.1 deaths per 100, 000.

As with other forms of cancer, the role of dietary factors in the development, and ultimately death from prostate cancer is consistent with geographic variations and time trends. However, there is a lack of consistent evidence with respect to the specific dietary factors that might be responsible for the development of prostate cancer. In general, the consumption of high fat diets (predominantly saturated animal fat), that typify western cultures, have been indicated as a risk factor for the development and progression of several cancers including prostate cancer in men [202].

Although the increased use of more sensitive diagnostic and screening tests has contributed to the rise in incidence rates of prostate cancer, it is not known whether these early detection techniques can actually influence the natural progression and outcome of the disease[203].

(d) Relative Survival Rate

The five-year relative survival rates (RSR) for prostate cancer reflect the percentage of the population with the disease who would be expected to live a further 5 years after diagnosis. Because prostate cancer usually occurs in older men who often have other health problems, relative survival rates are generally used to produce a standard way of discussing prognosis (outlook for survival).

Trend

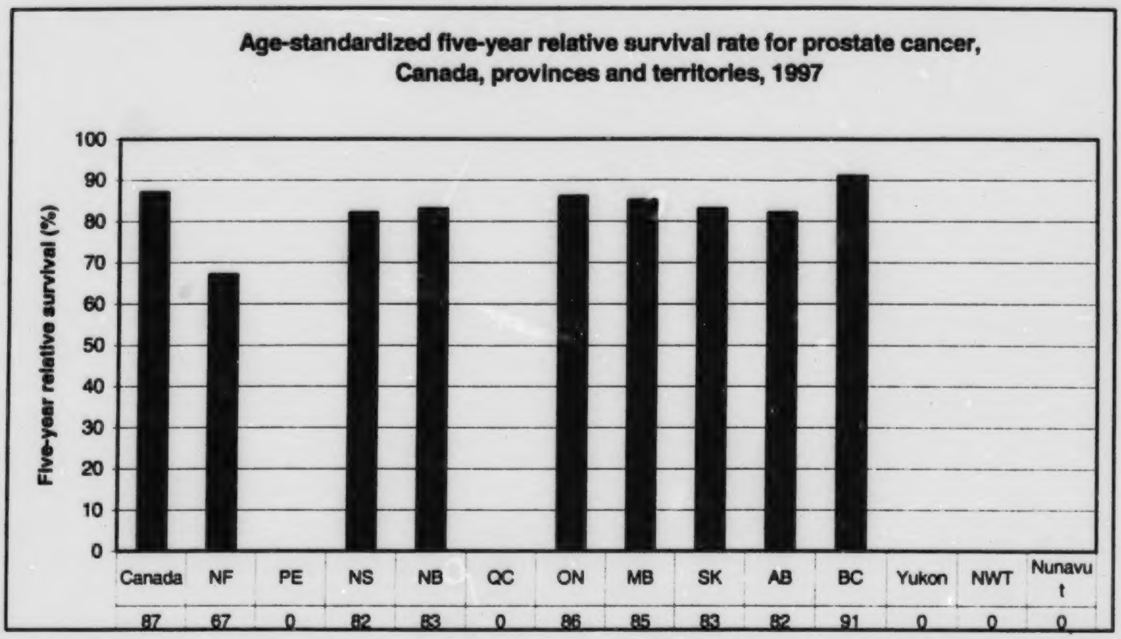
Between 1990-1992, Saskatchewan's relative survival rate was recorded as 83%, slightly below that of the national average. This means that a Saskatchewan man aged 15 to 99 was expected to have an 83% chance of living another five years with prostate cancer. Caution must be taken in interpreting these results due to the possibility of *lead-time bias* introduced by the advent of PSA testing in the early 1990s. Variations in the used of PSA testing may have impacted the five-year survival data from 1992, at it was collected at the beginning of widespread PSA testing.

Provincial/Territorial Comparisons

As can be seen, the data indicates a degree of similarity between provinces in their relative survival rates. The highest rates of relative survival (91%) are recorded in British Columbia in 1997, which is the only province above the national average of 87%. Saskatchewan has a similar survival rate to the other reporting jurisdictions.

Although mortality rates indicate that more men die in Saskatchewan from prostate cancer than any other province, the time to death in those diagnosed with the disease is not dissimilar to that experienced in other provinces across Canada.

Figure 112 Prostate Cancer Relative Survival Rate: Provincial Comparison, 1997



Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian and provincial life tables (1990-1992); ISQ

Note: Quebec data is not included in the national estimates of five-year relative survival because its cancer data collection methods differ substantially from that of other provincial cancer registries. Results for Prince Edward Island, the Yukon Territory, the Northwest Territories and Nunavut are not shown because of an insufficient number of cases for analysis; however, they are included in the national estimates.

International Comparison

There is no comparable data currently available for making international comparisons of relative survival rates for prostate cancer.

4.5 Colorectal Cancer

(a) Incidence rate

All references to colorectal cancer are based on the definition provided by the Ninth Revision of the International Classification of Diseases (ICD-9). Colorectal cancer is defined as malignant neoplasms of the colon, rectum, or rectosigmoid junction (153-154).

Trend

The age-standardized incidence rate per 100,000 population for colorectal cancer in Saskatchewan was marked by fluctuations during the 1976- 1997 period. Between 1976 and 1981, the incidence rate increased from 42.8 to 50.8 cases per 100,000 population before dropping to 46.2 cases per 100,000 population in 1982. In 1989, the incidence rate dropped further to 44.8 cases per 100,000 population. It is likely that the major declines in incidence rate in 1982 and 1989 were influenced by corresponding decreases in the incidence rate among males in the same periods.

The peaks of the age-standardized colorectal cancer incidence rate were recorded in 1983 at 52.0 cases and 1985 at 52.8 cases per 100,000 population. On the other hand, the 1992 decline was influenced by the decline in the female colorectal rate.

Although the age-standardized incidence rates have fluctuated in Saskatchewan, there is some indication that incidence rates of colorectal cancer have been decreasing since 1985 in the general population[197]. However, it would be misleading to assume that this lessens the burden that colorectal cancer places on society. Due to the growth and ageing of the population, the number of cases of colorectal cancer continues to increase steadily for both men and women, and as such colorectal cancer continues to rank as the second most frequent cause of cancer deaths among Canadians [197].

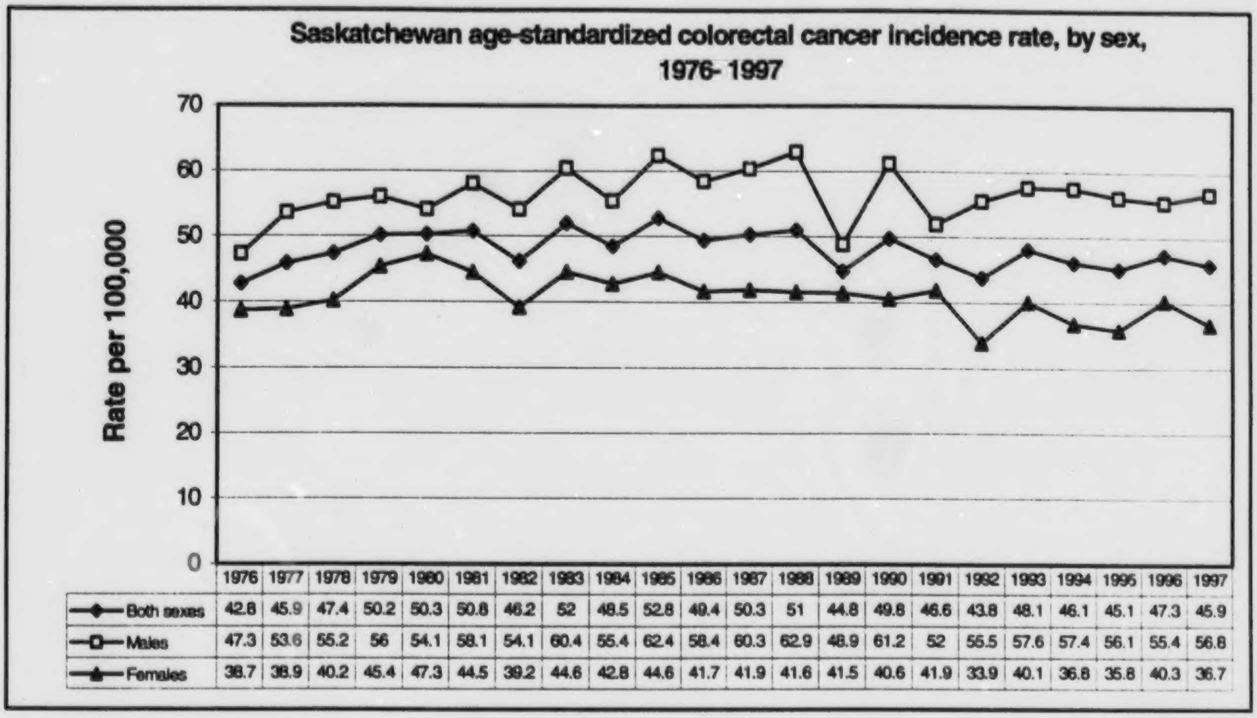
Sex

Colorectal cancer is the third most common cause of death from cancer for Canadian men and women. Generally, the incidence rate among males has been higher than among females. The incidence of male colorectal cancer is slightly lower in 1997 (56.8 cases for every 100,000 males) than it was at its peak in 1988 (62.9 for every 100,000). It is still much more common, however, than in 1976 when 47.3 of every 100,000 males were diagnosed with colorectal cancer. The trend was similar among females. For every 100,000 females, the number of new cases of colorectal cancer rose from 38.7 in 1976 to 47.3 in 1980, before declining to 36.7 in 1997.

Distinct incidence patterns have also been observed based on the location of the disease in specific parts of the colon and rectum. However, regardless of site, the incidence of colorectal cancer is lower in women than in men. This may be due to a decrease in exposure to risk factors for the disease such as diet and hormones.[204] Data from the 1998/99 National Population Health Survey (NPHS) suggested that Canadian women might be more concerned about nutrition than their male counterparts. For example, significantly more women (33 per cent) than men (23 per cent) said they either chose or avoided foods because they were worried about developing cancer.

Although the exact relationship between diet, particularly dietary fibre, and colorectal cancer remains unclear, the most recent studies suggest that fibre may not be as responsible for decreasing colorectal cancer risk as was previously thought.[205] Specific food choice behaviours, such as low dietary fat intakes from meat that are described in the NPHS, as being more commonly practiced by Canadian women, may lead to a protective benefit for them in terms of colorectal cancer risk. In 1998/99, women were significantly more likely than men to choose foods because of lower fat and higher fibre content. And a lower proportion of men than women selected foods based on their vitamin and mineral content.

Figure 113 Colorectal Cancer Incidence Rate: Saskatchewan trend, 1976-1997



	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
—◆— Both sexes	42.8	45.9	47.4	50.2	50.3	50.8	46.2	52	48.5	52.8	49.4	50.3	51	44.8	49.8	46.6	43.8	48.1	46.1	45.1	47.3	45.9
—□— Males	47.3	53.6	55.2	56	54.1	58.1	54.1	60.4	55.4	62.4	58.4	60.3	62.9	48.9	61.2	52	55.5	57.6	57.4	56.1	55.4	56.8
—▲— Females	38.7	38.9	40.2	45.4	47.3	44.5	39.2	44.6	42.8	44.6	41.7	41.9	41.6	41.5	40.6	41.9	33.9	40.1	36.8	35.8	40.3	36.7

Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Provincial/Territorial Comparisons

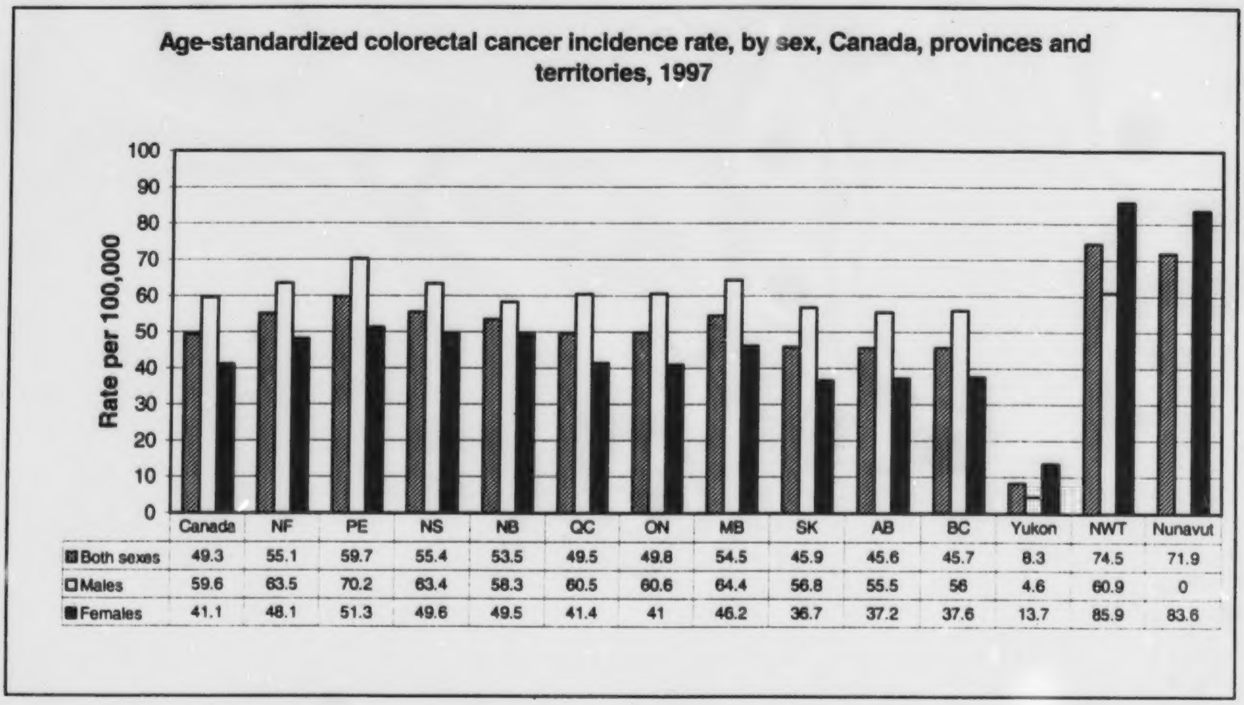
Of all the provinces and territories, Saskatchewan had the fourth lowest (45.9) colorectal cancer incidence rate after the Yukon Territory (8.3), Alberta (45.6) and British Columbia (45.7).

Saskatchewan had the fourth lowest male colorectal cancer incidence rate (56.8) after the Yukon (4.6), Alberta (55.5) and British Columbia (56). Saskatchewan had the second lowest (36.7) colorectal cancer incidence rate for females after the Yukon, which had 13.7 cases of colorectal cancer per 100,000 females in 1997. Again, the small number of cases means that rates for the Northwest Territories, the Yukon and Nunavut are subject to high variability.

Dietary differences between Canadians may offer one explanation for the geographic variations. High fat consumption has been associated with colorectal cancer risk, while the consumption of dietary fibre, including fruit and vegetable sources, many of which contain vitamins A, C and E, have been shown in some studies, but not conclusively, to offer a protective effect against colorectal cancer.[206] Debate remains about whether it is the fibre content per se or the antioxidant content of specific food sources such as fruits and vegetables that confer this protective effect.

Physical activity has also been shown to reduce the risk of colorectal cancer. Alcohol use and long-term cigarette smoking have also been implicated in the development of colorectal cancer.[207] Again, differences in the use of alcohol, cigarettes smoking and physical activity levels all vary on a geographical basis, and as such may contribute the provincial variation in the incidence of colorectal cancer observed.

Figure 114 Colorectal Cancer Incidence Rate: Provincial Comparison, 1997



Age-standardized colorectal cancer incidence rate, by sex, Canada, provinces and territories, 1997

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	49.3	55.1	59.7	55.4	53.5	49.5	49.8	54.5	45.9	45.6	45.7	8.3	74.5	71.9
☐ Males	59.6	63.5	70.2	63.4	58.3	60.5	60.6	64.4	56.8	55.5	56	4.6	60.9	0
■ Females	41.1	48.1	51.3	49.6	49.5	41.4	41	46.2	36.7	37.2	37.6	13.7	85.9	83.6

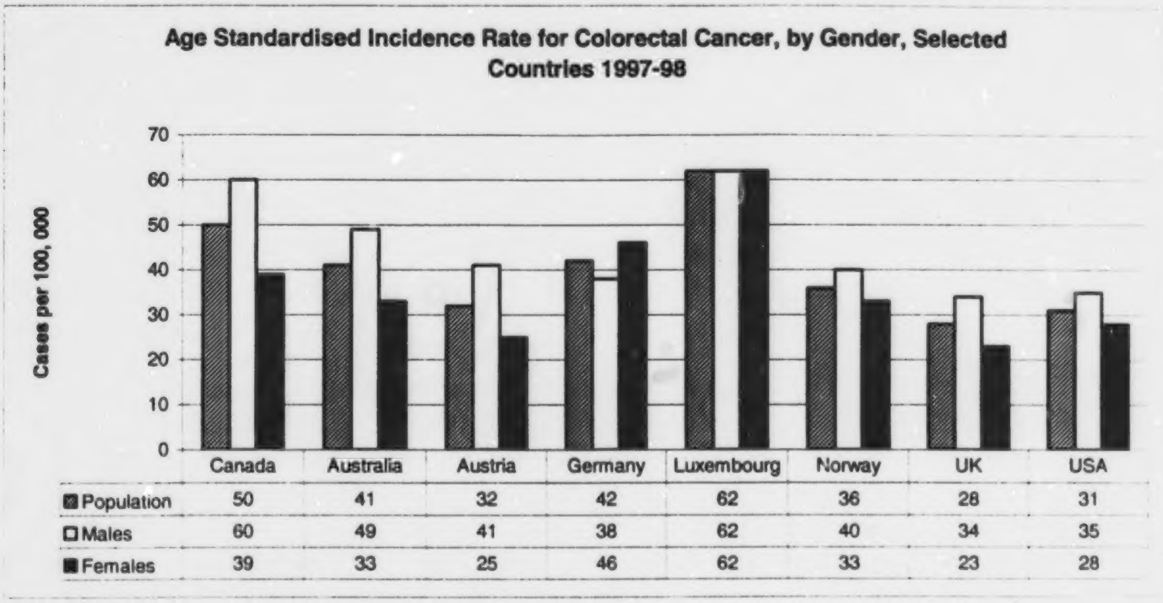
Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Note: Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count. Nunavut's rate for males was suppressed to protect confidentiality.

International Comparisons

Only those countries with data from a similar time period as the Canadian data are presented (as opposed to all 23 OECD countries). Data from later years were included if it represented the highest or lowest incidence rates of the international data set. Again using the OECD 2001 report data, incidence rate for colorectal cancer were seen to vary between comparable countries reporting in 1998 and 1999. On an international basis, the incidence rate of colorectal cancer for the population of Canada (50 cases per 100, 000) is second only to that in Luxembourg (62 cases per 100, 000). In contrast, the lowest rate of reported new cases of colorectal cancer is found for the United Kingdom, 28 cases per 100, 000 of the population being recorded in 1997.

Figure 115 Colorectal Cancer Incidence Rate: International Comparison



	Canada	Australia	Austria	Germany	Luxembourg	Norway	UK	USA
▨ Population	50	41	32	42	62	36	28	31
☐ Males	60	49	41	38	62	40	34	35
■ Females	39	33	25	46	62	33	23	28

Source: Organization for Economic Cooperation and Development

The sources of these international differences remain to be clarified but it is likely that differences in exposure to risk factors that are present within Canada are highlighted when differences between countries are examined. Differences between countries in dietary and physical activity patterns may contribute to the international variation observed. Such differences in exposure to risk factors (e.g. diet, exogenous hormones, physical activity) [208] or participation in prevention programs, may have benefited women more than men, and in part help to explain the gender difference in colorectal cancer rates found internationally as well as within Canada.

The largest impact on international comparisons may however be a result of differences in the screening procedures used. An important feature of colorectal cancer is that the use of scoping procedures that can detect precancerous polyps or lesions, can lead to the removal of potentially cancerous tumours, and thus possibly lead to a reduction in the colorectal cancer incidence rates [197]. There is increasing evidence from the cancer literature [225] suggesting that colorectal cancer incidence (and mortality) can be decreased by early detection, although long-term trials are still needed to establish the effectiveness of early screening procedures.

The incidence rate for colorectal cancer, especially in Canadian men (60 cases per 100,000) is one of the highest internationally, and suggests that colorectal cancer remains a serious disease that is responsible for a substantial part of the overall cancer burden in Canada.

(b) Potential Years of Life Lost (PYLL)

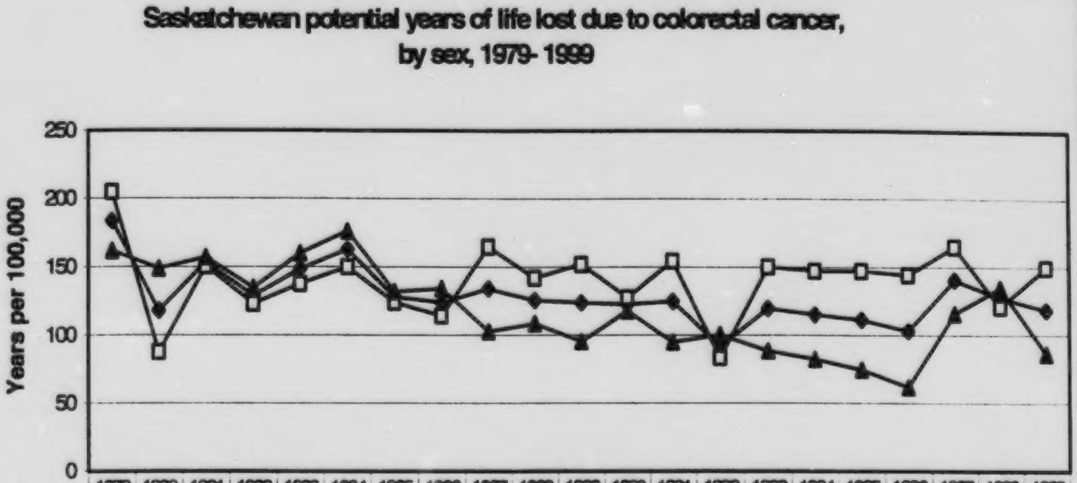
Trend

As mentioned earlier, rates of premature death from cancer (i.e., prior to age 75) is represented by potential years of lost life (PYLL). The PYLL rates for deaths attributed to colorectal cancer per 100,000 Saskatchewan residents fluctuated between 1979 and 1999. In 1979, Saskatchewan's rate of premature mortality was 183.5 years per 100,000, which decreased to 123.9 (per 100,000) in 1989. In the subsequent decade, the PYLL rate dropped further to 118.2 years per 100,000 population. The marked declines in the 1979-1980 and 1991-1992 periods were influenced by declines mainly in the male PYLL rates.

Sex

The pattern of the PYLL rates for male and female colorectal cancer fluctuated during the 21-year period. For example, between 1980 and 1986, the PYLL rates for female colorectal cancer were higher than the male rates. Similarly, in 1992 and 1998, the PYLL rates for male colorectal cancer were lower than the female rates.

Figure 116 Colorectal Cancer PYLL: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
—◆— Both sexes	183.5	117.9	153.6	128.8	148.5	162.7	127.9	124	134	125.4	123.9	122.6	124.8	91.8	119.6	115.2	111.4	103.3	140.5	127.6	118.2
—□— Males	204.8	87.8	150.4	123.1	137.6	149.8	124.1	114.2	164.7	141.9	151.8	127.4	154.2	83.4	150.2	147.2	147.3	144	164.6	120.7	149.4
—▲— Females	161.6	148.8	156.8	134.6	159.7	176	131.8	134.1	102.7	108.6	95.6	117.8	94.9	100.4	88.5	82.5	74.8	61.8	115.9	134.7	86.4

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Since PYLL is a measure of premature mortality, this indicator gives more importance to the causes of death that occurred prior to age 75 than those occurring at older ages. As such the PYLL rates provide an indication of the economic and social burdens that colorectal cancer presents to society. Although PYLL due to colorectal cancer has decreased for both men and women in Saskatchewan, targeting high-risk individuals continues to be an effective and efficient way of reducing the overall burden this disease places on the province.

Screening allows for the early detection and treatment of pre-cancerous growths. Screening tests must also be acceptable to the population. Education programs that coincide with screening procedures are also necessary to help individuals understand the importance of the disease, risk factors for it, the benefits of screening and the nature of the test itself[209]. Acceptance of screening procedures may also change over time based on experience and the impact of education, and given time may contribute to changing rates of PYLL due to colorectal cancer.

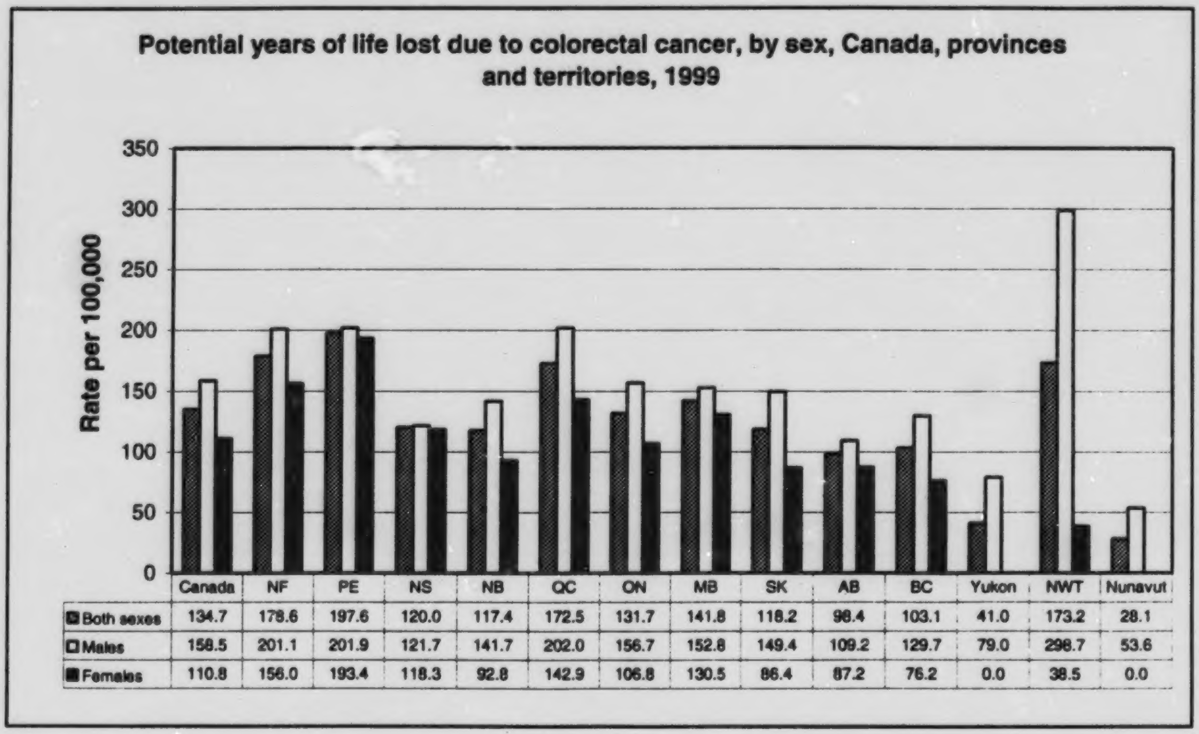
Provincial/Territorial Comparisons

Saskatchewan has a PYLL due to colorectal cancer of 118.2 years of life lost per 100,000, which is lower than the national average of 134.7 years per 100,000 population.

Saskatchewan has the fifth lowest (86.4) PYLL rate for female colorectal cancer after British Columbia (76.2), the Northwest Territories (38.5) and Nunavut and Yukon (0). Although the Yukon Territory, the Northwest Territories and Nunavut have one of the lowest PYLL rates for colorectal cancer, these rates should be interpreted with caution due to small underlying counts. Saskatchewan had the seventh lowest (149.4) PYLL rate for male colorectal cancer.

Several factors must be taken into consideration when interpreting inter-provincial differences. For example, attempts to link socio-economic status with cancer have been made for many years [210], with a relationship between lower socio-economic status and cancer in general being noted by some, considerable variation in the association of a specific cancer-site and socio-economic position has been noted [211]. Although the prevalence of risk factors is likely to vary along provincial lines, proof of a causal association between these risk factors and the disease requires more detailed studies.

Figure 117 Colorectal Cancer PYLL: Provincial Comparison, 1999



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	134.7	178.6	197.6	120.0	117.4	172.5	131.7	141.8	118.2	98.4	103.1	41.0	173.2	28.1
☐ Males	158.5	201.1	201.9	121.7	141.7	202.0	156.7	152.8	149.4	109.2	129.7	79.0	298.7	53.6
■ Females	110.8	156.0	193.4	118.3	92.8	142.9	106.8	130.5	86.4	87.2	76.2	0.0	38.5	0.0

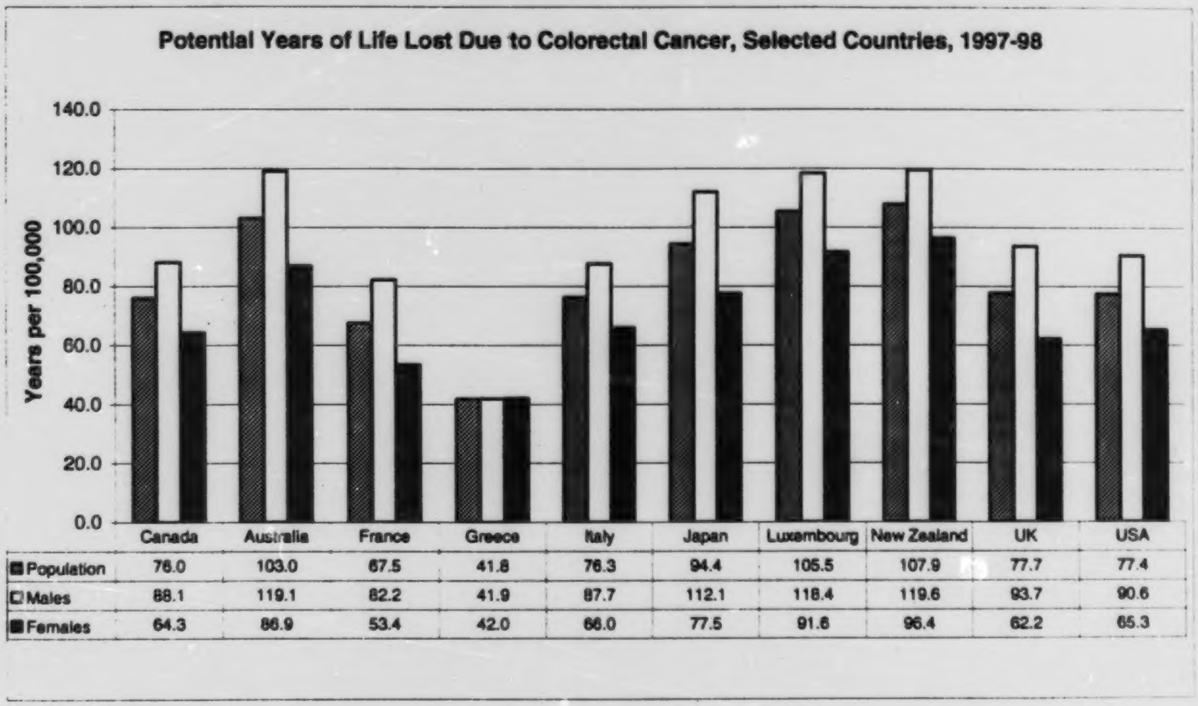
Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Note: Potential years of life lost for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

International Comparisons

The definition of PYLL used in the OECD 2001 report is based on estimates of premature death prior to age 70, not age 75 as outlined earlier in this section. Estimates for the PYLL due to colorectal cancer per 100,000 population are provided. Only those countries with data from a similar time period as the Canadian data are presented (as opposed to all 23 OECD countries). Data from later years were included if it represented the highest or lowest PYLL rates of the international data set.

Figure 118 Colorectal Cancer PYLL: International Comparison



	Canada	Australia	France	Greece	Italy	Japan	Luxembourg	New Zealand	UK	USA
▨ Population	76.0	103.0	67.5	41.8	76.3	94.4	105.5	107.9	77.7	77.4
☐ Males	88.1	119.1	82.2	41.9	87.7	112.1	118.4	119.6	93.7	90.6
■ Females	64.3	86.9	53.4	42.0	66.0	77.5	91.6	96.4	62.2	65.3

Source: Organization for Economic Cooperation and Development

Colorectal cancer is the second leading cause of PYLL due to all cancers in men, and the third most significant for women (Canadian Cancer Statistics, 2001). Premature mortality from colorectal cancer, therefore, highlights the substantial burden that this disease places on Canada economically and socially. With reference to international standards, however, Canada's PYLL rate for the total population (76.0 years per 100, 000) is similar to several other countries, such as Italy (76.3 years per 100, 000), the UK (77.7 years per 100, 000), and the USA (77.4 years per 100, 000).

The highest rates of premature mortality due to colorectal cancer were observed in New Zealand in 1998, where a PYLL of 107.9 years per every 100, 000 of the population was recorded. The lowest rate was reported in Greece for the same year (41.8 years per 100, 000). Interestingly too, Greece also does not exhibit the same degree of gender difference in the rates of PYLL due to colorectal cancer. Consistently, for every other country, female rates of premature mortality due to colorectal cancer were lower than those estimated for males. The rates of PYLL, although higher for the total population in Greece, were actually higher in Australia (119.1 years per 100,000) and New Zealand (119.6 years per 100, 000) when men were analyzed separately. Canadian women have the third lowest rate of PYLL due to colorectal cancer (64.3 years per 100, 000), after Greece (42.0 years per 100, 000), and the UK (62.2 years per 100, 000).

Countries with advanced screening procedures are likely to exhibit lower PYLL associated with colorectal cancer. Despite evidence that early detection and treatment leads to a decrease in cancer-related mortality, the adoption of regular screening procedures by the eligible population in Canada (i.e., individuals aged 50 years and above) is low (Colorectal Cancer Society of Canada)[212].

Gender differences, that occur on an international basis as well as within Canada still remain to be explained. It has been suggested, however, that the adoption of a healthier diet by women in general (i.e., increased consumption of fruits and vegetables and decreases in saturated fat intake) is associated with the decreased risk of developing and dying prematurely from colorectal cancer. It would appear that this phenomenon is not limited to Canada, women in general appear to ingest less dietary fat, especially saturated fat from animal sources, than men [230].

(c) Mortality Rate

Trend

Colorectal cancer death rates were lower in the 1990s than in the late 1970s. Age-standardized mortality rates for colorectal cancer declined between 1979 and 1989 by 23 per cent from 24.1 to 18.6 deaths per 100,000 population. A further decline of 9 per cent (18.6 to 16.9) was reported between 1989 and 1999.

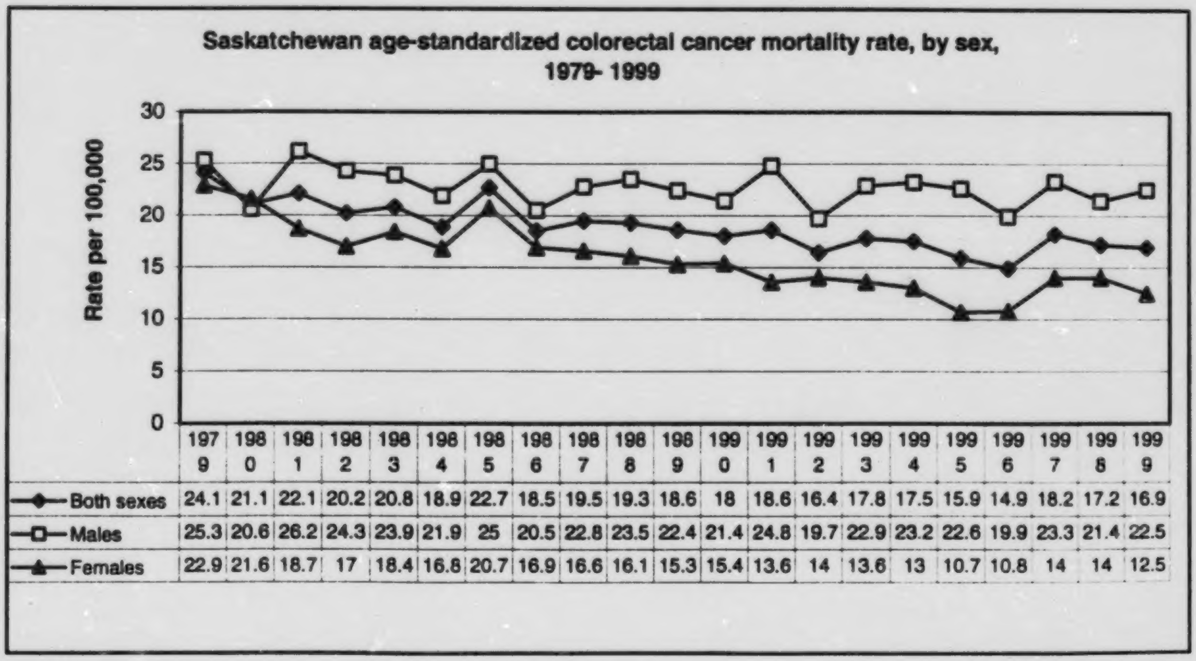
Sex

Between 1979 and 1999, the mortality rate for colorectal cancer in males was higher than in females in Saskatchewan. . Colorectal cancer mortality rates among men and women were lower in 1999 than in the late 1970s. The male rate, however, declined more slowly than the female rate. An estimated 23 of every 100,000 males died of colorectal cancer in 1999, only marginally reduced from 25 in 1979. Among females, the rate dropped to an estimated 13 deaths for every 100,000 females in 1999, from 23 deaths in 1979.

The gap between the male and female age-standardized mortality rates for colorectal cancer has been widening during the 1979-1999 period. For example, in 1979, the gender difference in the age-standardized mortality rate for colorectal cancer was 2.4 deaths per 100,000 population. In 1989, the difference increased to 7.1, and to 10.0 deaths per 100,000 population in 1999.

These mortality trends suggest that the decline in mortality may be attributable to widespread use of early detection methods [213] and increased rates of colorectal cancer screening.[214] Screening for colorectal cancer in the Canadian population was not widespread in 1992.[215] However, consensus is emerging internationally about the benefits of population-based screening for colorectal cancer. Casual screening is already prevalent in Canada and may have contributed to the reduction in mortality rates observed in recent years.
The differential rate of decline in mortality between men and women may be due to lifestyle changes, such as a the adoption of lower fat diets (especially from animal sources), or reductions in daily cigarette smoking and participation in screening and prevention programs that have benefited women more than men. Factors that contribute to decreases in the incidence of colorectal cancer are also likely to contribute to changes in mortality rates for the disease.

Figure 119 Colorectal Cancer Mortality Rate: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Both sexes	24.1	21.1	22.1	20.2	20.8	18.9	22.7	18.5	19.5	19.3	18.6	18	18.6	16.4	17.8	17.5	15.9	14.9	18.2	17.2	16.9
□ Males	25.3	20.6	26.2	24.3	23.9	21.9	25	20.5	22.8	23.5	22.4	21.4	24.8	19.7	22.9	23.2	22.6	19.9	23.3	21.4	22.5
▲ Females	22.9	21.6	18.7	17	18.4	16.8	20.7	16.9	16.6	16.1	15.3	15.4	13.6	14	13.6	13	10.7	10.8	14	14	12.5

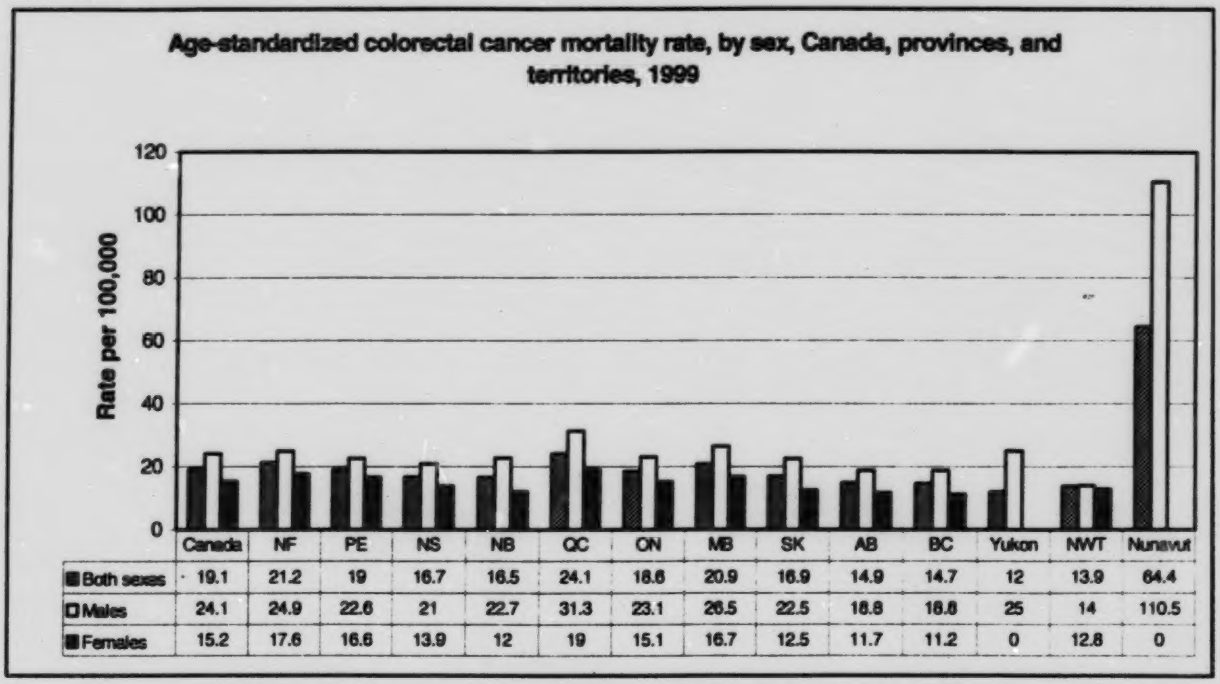
Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Provincial/Territorial Comparisons

Mortality rates, like incidence rates, are generally lower in the western provinces and higher in central and eastern Canada. Saskatchewan's mortality rate for colorectal cancer was 16.9 deaths per 100,000 population, lower than the national average of 19.1 deaths per 100,000.

The age-standardized colorectal cancer mortality rate among men was lowest in the Northwest Territories (14), Alberta (18.8) and British Columbia (18.8). Saskatchewan's male mortality rate for colorectal cancer was 22.5 deaths per 100,000 population.

Figure 120 Colorectal Cancer Mortality Rate: Provincial Comparison, 1999



Age-standardized colorectal cancer mortality rate, by sex, Canada, provinces, and territories, 1999

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	19.1	21.2	19	16.7	16.5	24.1	18.6	20.9	16.9	14.9	14.7	12	13.9	64.4
□ Males	24.1	24.9	22.6	21	22.7	31.3	23.1	26.5	22.5	18.8	18.8	25	14	110.5
■ Females	15.2	17.6	16.6	13.9	12	19	15.1	16.7	12.5	11.7	11.2	0	12.8	0

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Note: Age-standardized mortality rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

Overall the geographic variations in female colorectal cancer mortality rates were similar to those of males where the lowest rates were in the Yukon and Nunavut (0). Saskatchewan women had the fifth lowest (12.5) colorectal cancer mortality rate.

Not only are there notable gender differences in dietary intakes of saturated fat, but also there are likely regional dietary patterns that contribute to colorectal cancer mortality. The same regional differences in risk factors (diet, exercise, lifestyle behaviours) that contribute to incidence patterns in colorectal cancer are likely to be the same as those involved in mortality rates.

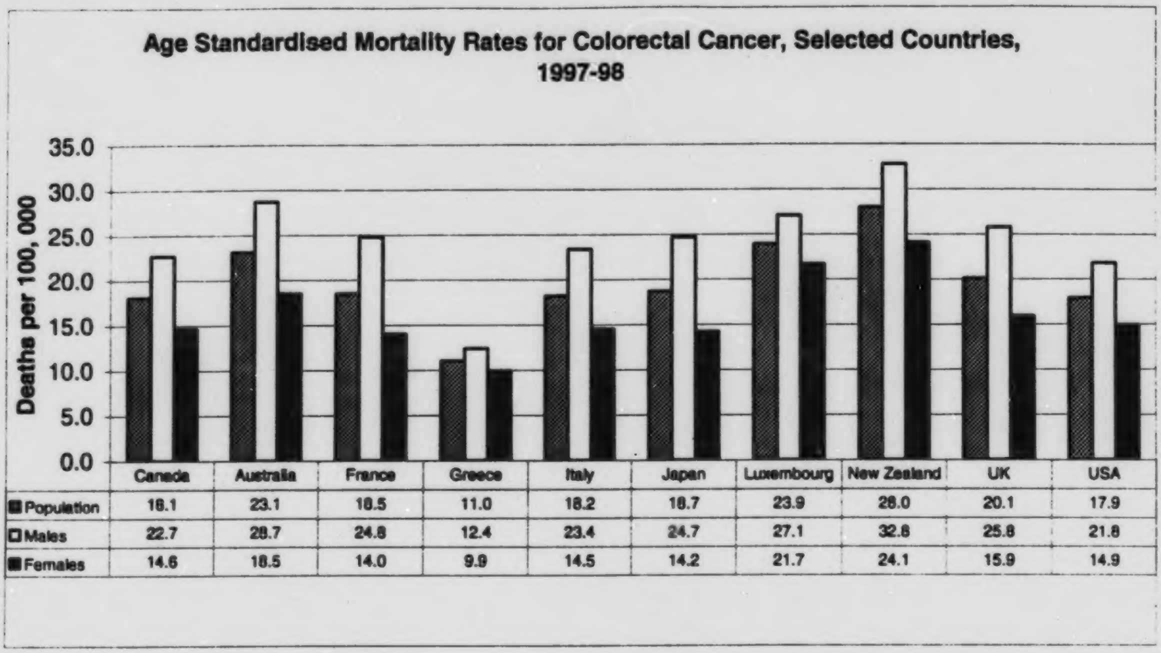
Cultural differences also exist in the use of health services for disease prevention purposes, which may lead to larger percentages of the population from Aboriginal backgrounds failing to become involved in early detection programs, which in turn contributes to a higher rate of mortality from colorectal cancer. Other previously discussed lifestyle factors (such as diet and exercise) associated with living in a certain cultural milieu, or socio-economic background is also likely to compound the mortality rates of the disease on a given population.

International Comparisons

Using the OECD 2001 report data, the estimates presented below represent the most recent year of data available for selected countries. Only those countries with data from a similar time period as the Canadian data (i.e., 1997) are presented (as opposed to all 23 OECD countries). Data from later years (1998) were included if it represented the highest or lowest mortality rates of the international data set.

As with breast and prostate cancer, the OECD population for 1980 is used for calculating age-standardized mortality rates.

Figure 121 Colorectal Cancer Mortality Rate: International Comparison



	Canada	Australia	France	Greece	Italy	Japan	Luxembourg	New Zealand	UK	USA
▨ Population	18.1	23.1	18.5	11.0	18.2	18.7	23.9	28.0	20.1	17.9
□ Males	22.7	28.7	24.8	12.4	23.4	24.7	27.1	32.8	25.8	21.8
■ Females	14.6	18.5	14.0	9.9	14.5	14.2	21.7	24.1	15.9	14.9

Source: Organization for Economic Cooperation and Development

The Canadian mortality rates for colorectal cancer (18.1 deaths per 100, 000) are very similar to those found in other countries. The USA, Italy, France and Japan (17.9, 18.2, 18.5 and 18.7 deaths per 100, 000 respectively) all reported rates similar to Canada's in 1997-98. The lowest colorectal cancer mortality rates were in Greece (11.0 deaths per 100, 000), which also has the lowest recorded mortality rates for both men and women when analyzed independently. The highest mortality rates were found in New Zealand (28.0 deaths per 100, 000), which again had the highest mortality rates for men and women when measured separately.

Consistently across all countries, female mortality rates from colorectal cancer are lower than those found for men. This gender difference may be partly due to declines in incidence. Changes in exposure to risk factors such as diet, exogenous hormones and physical activity are modifiable risk factors that have been adopted by women more than men, and are thus may contribute to the decline in incidence and mortality rates observed for colorectal cancer in many Western developed countries[216].

Explanations focused on modifiable risk factors do not fully explain the international differences in colorectal cancer mortality rates as several countries known for their reduced intake of dietary fat have rates as high as countries where high fat intakes from animal products are more common. Other factors such as improvements in screening and treatment for colorectal cancer, which are also likely to vary on an international basis, could also influence mortality rates. Early detection procedures for colorectal cancer have been shown in randomised trials to yield a mortality reduction of about 20% in people over 50 [217].

Colorectal cancer mortality rates can be effectively reduced through the detection and removal of precancerous lesions. Although procedural differences between countries may result in differences in mortality being observed, they do not explain the gender difference in deaths due to colorectal cancer on an international basis. Further research is required to more fully understand the factors involved in decreasing the mortality rates associated with colorectal cancer, particularly in men.

(d) Relative Survival Rate

Relative survival rates represent the ratio of observed survival in the group of cancer patients and survival that would be expected had they been only subjected to the mortality rates of the general population with similar characteristics such as age, sex, and geographic location. The time period over which relative survival rates have been considered in this document is five-years.

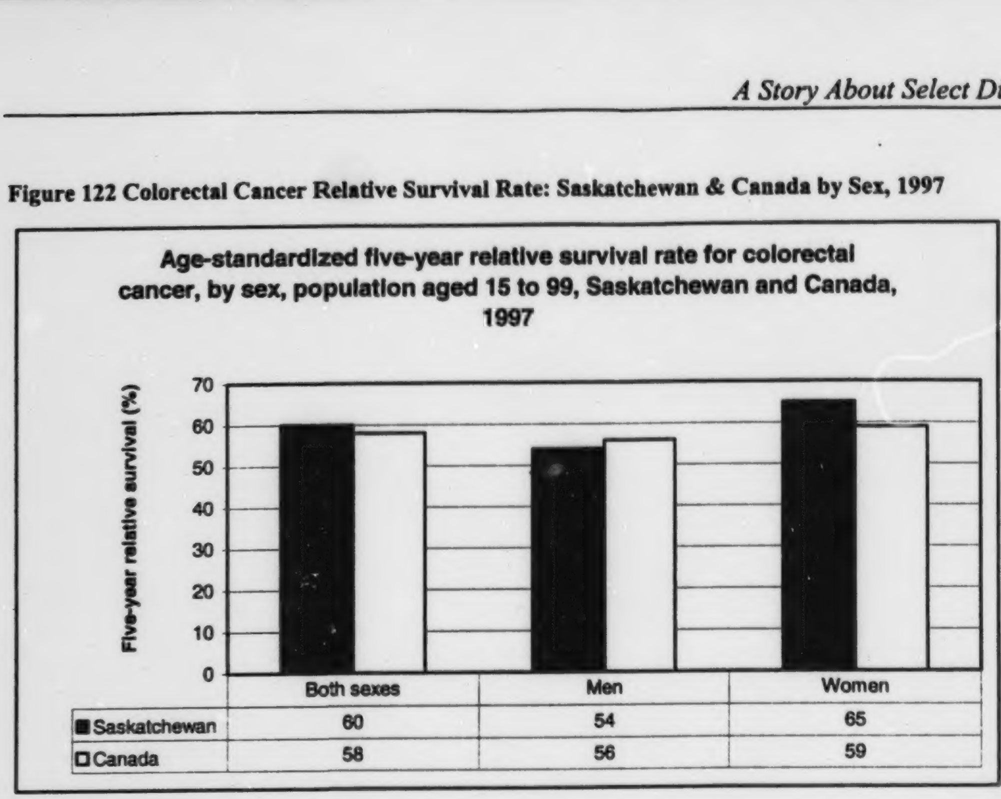
Trend

Saskatchewan's age-standardized five-year relative survival rate for colorectal cancer at 60 per cent was higher than the national average of 58 per cent in 1992. This means that in Saskatchewan, of those individuals aged 15 to 99 diagnosed with colorectal cancer in 1992 60 per cent could expect to live another five years compared to 58 per cent for Canada.

Sex

The age-standardized five-year relative survival rate for colorectal cancer was higher for women (65 per cent) than for men (54 per cent) in Saskatchewan. Similarly, Canadian women (59 per cent) had a higher age-standardized five-year relative survival rate for colorectal cancer than did men (56 per cent)..

Figure 122 Colorectal Cancer Relative Survival Rate: Saskatchewan & Canada by Sex, 1997



Age-standardized five-year relative survival rate for colorectal cancer, by sex, population aged 15 to 99, Saskatchewan and Canada, 1997

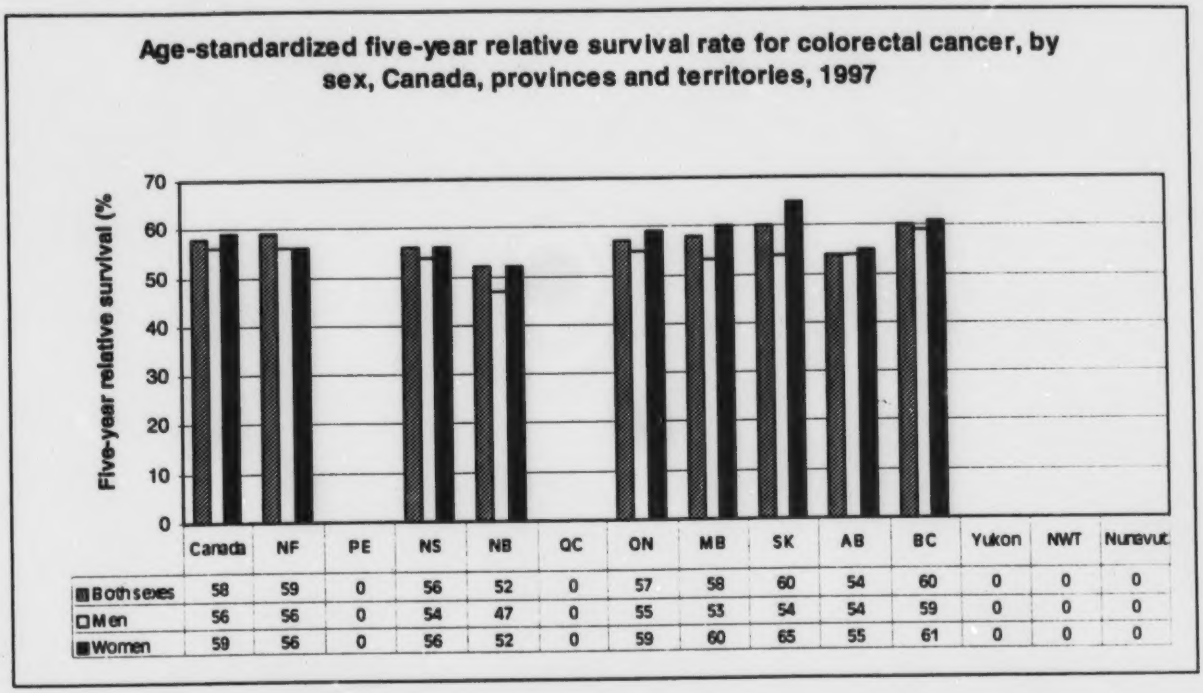
	Both sexes	Men	Women
■ Saskatchewan	60	54	65
□ Canada	58	56	59

Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian and provincial life tables (1990-1992); ISQ

Provincial/Territorial Comparisons

Among men with colorectal cancer, British Columbia's relative survival rate was the highest (59 per cent). For women, the highest rate was in Saskatchewan (65 per cent). The largest male-female difference between colorectal cancer survival rates was in Saskatchewan (11 per cent). However, because reporting procedures vary across the country, provincial differences in survival rates should be interpreted with caution.

Figure 123 Colorectal Cancer Relative Survival Rate: Provincial Comparison, 1997



Age-standardized five-year relative survival rate for colorectal cancer, by sex, Canada, provinces and territories, 1997

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	58	59	0	56	52	0	57	58	60	54	60	0	0	0
☐ Men	56	56	0	54	47	0	55	53	54	54	59	0	0	0
■ Women	59	56	0	56	52	0	59	60	65	55	61	0	0	0

Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian and provincial life tables (1990-1992); ISQ

Note: Quebec data is not included in the national estimates of five-year relative survival because its cancer data collection methods differ substantially from that of other provincial cancer registries. Results for Prince Edward Island, the Yukon Territory, the Northwest Territories and Nunavut are not shown because of an insufficient number of cases for analysis; they were however, included in the national estimates.

Early detection plays a key role in improving relative survival rates, as patients who have surgery in the early stages of colorectal cancer have a "better than 90%" chance of long-term survival. Inter-provincial differences in screening procedures and follow-up care, therefore, may play a role in relative survival rates, in much the same way as they do for mortality rates.

Saskatchewan residents benefit from the provision of cancer treatment at two cancer clinics in the province. Immediate registration at the clinic occurs after diagnosis, which reduces the time to treatment, and enhances chances of survival [218].

International Comparison

No data are currently available which are comparable to Canadian data on relative survival rates for colorectal cancer. International comparisons are, therefore, not possible.

4.6 Lung Cancer

All references to lung cancer are based on the definition provided by the Ninth Revision of the International Classification of Diseases (ICD-9). Lung cancer is defined as a malignant neoplasm of the trachea, bronchus and lung (162).

(a) Incidence rate

Trend

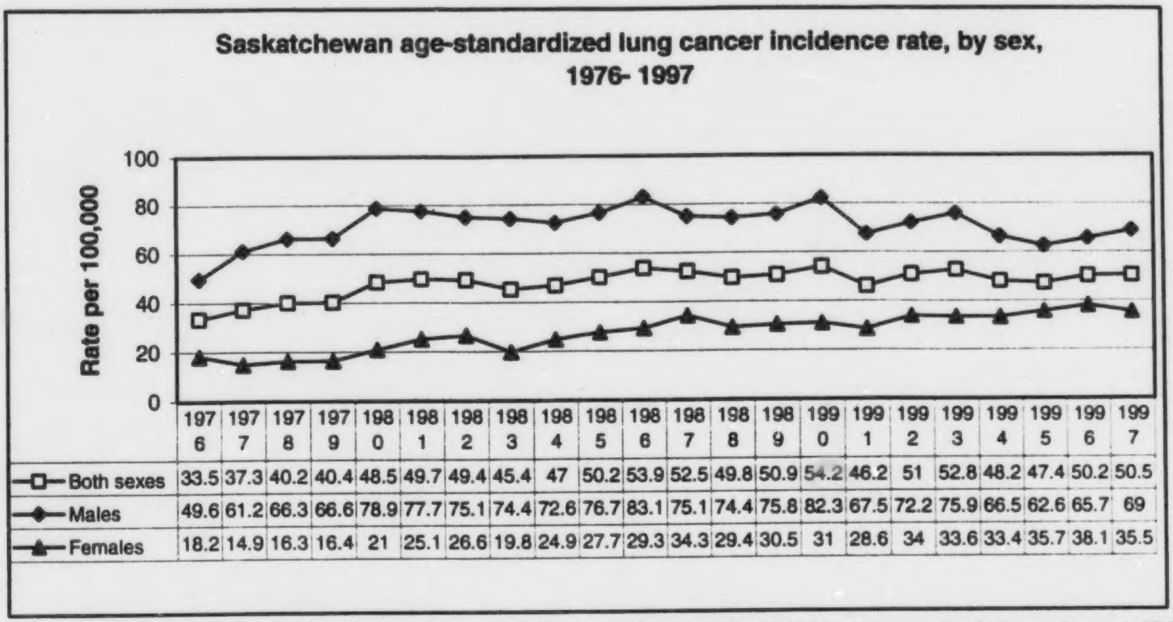
Between 1976 and 1997, the age standardized lung cancer incidence rate in Saskatchewan increased from 33.5 to 50.5 cases per 100,000 population. This 51% increase was marked by fluctuations over the 22- year period.

Sex

The lung cancer incidence rate peaked in 1990 at 54.2 cases per 100,000 population, which was greatly influenced by the high incidence rate among males' (82.3). During the period of analysis, Saskatchewan males have much higher incidence rates than females. However, the female incidence rate has increased by a greater percentage. Specifically, the male incidence of lung cancer increased by 38% going from 50 cases per 100,000 in 1976 to 69 cases per 100,000 in 1997. The female incidence rate increased by 100%, going from 18 cases per 100,000 population in 1976 to 36 per 100,000 in 1997.

The lung cancer incidence rate among females, although lower than that for males, has been increasing at a much faster rate in recent years. The incidence rate of lung cancer for males plateaued in the mid-1980s and has since shown a decline, probably reflecting the drop in men's tobacco consumption since the mid- 1960s.[219] Although significant decreases in smoking prevalence in women started in the early 1980s the impact of these decreases were not likely captured in the current analysis, as the average lag time between starting to smoke and developing lung cancer is over twenty years [220]. As a result, while the incidence of lung cancer among Saskatchewan men is two times that of women, the gap has narrowed.

Figure 124 Lung Cancer Incidence Rate: Saskatchewan Trend, 1976-97



Saskatchewan age-standardized lung cancer incidence rate, by sex, 1976- 1997

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
—□— Both sexes	33.5	37.3	40.2	40.4	48.5	49.7	49.4	45.4	47	50.2	53.9	52.5	49.8	50.9	54.2	46.2	51	52.8	48.2	47.4	50.2	50.5
—◆— Males	49.6	61.2	66.3	66.6	78.9	77.7	75.1	74.4	72.6	76.7	83.1	75.1	74.4	75.8	82.3	67.5	72.2	75.9	66.5	62.6	65.7	69
—▲— Females	18.2	14.9	16.3	16.4	21	25.1	26.6	19.8	24.9	27.7	29.3	34.3	29.4	30.5	31	28.6	34	33.6	33.4	35.7	38.1	35.5

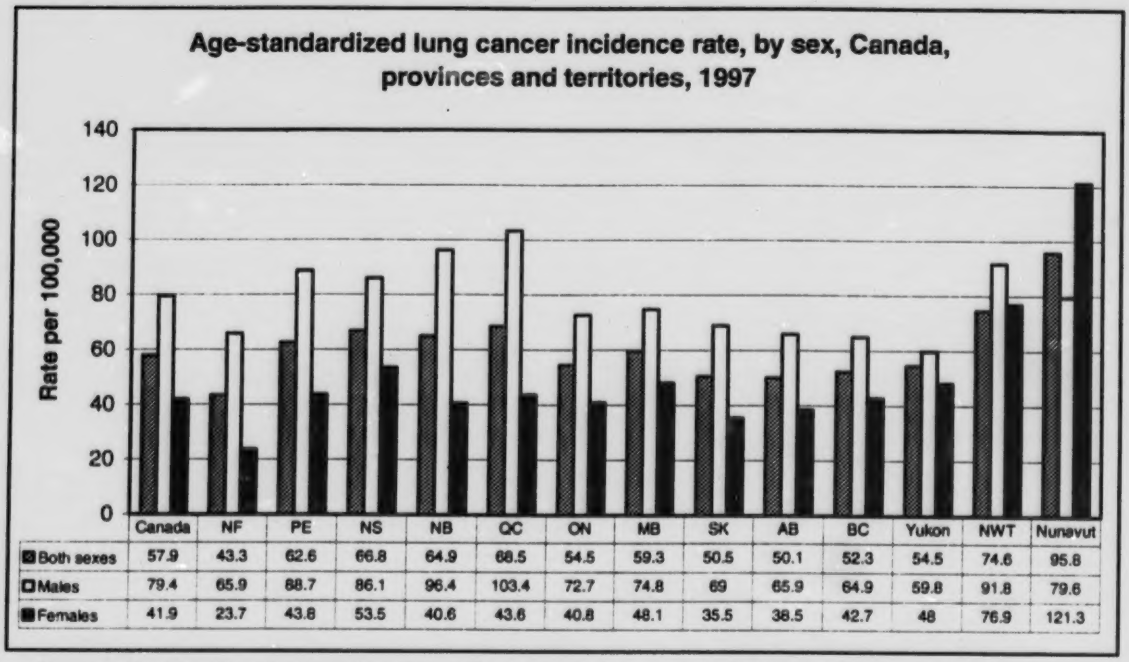
Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Provincial/Territorial Comparisons

In 1997, provincial and territorial differences in lung cancer incidence rates varied considerably, ranging from 43.3 to 95.8 cases per 100,000. In Saskatchewan, the incidence rate of lung cancer incidence was 50.5 cases per 100,000, which was lower than the national average of 57.9 cases per 100,000.

In comparisons by gender, Saskatchewan had the fifth lowest lung cancer incidence rate among males (69.0) after the Yukon (59.8), British Columbia (64.9), Alberta and Newfoundland (65.9). With respect to the rates for females, Saskatchewan (35.5) had the second lowest rate after Newfoundland (23.7).

Figure 125 Lung Cancer Incidence Rate: Provincial Comparison, 1997



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	57.9	43.3	62.6	66.8	64.9	68.5	54.5	59.3	50.5	50.1	52.3	54.5	74.6	95.8
☐ Males	79.4	65.9	88.7	86.1	96.4	103.4	72.7	74.8	69	65.9	64.9	59.8	91.8	79.6
■ Females	41.9	23.7	43.8	53.5	40.6	43.6	40.8	48.1	35.5	38.5	42.7	48	76.9	121.3

Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

__Note:__ Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

Lung cancer is the leading cause of cancer-related death in Canada, with tobacco use being the single most preventable cause of the disease. It is the second leading form of cancer in Canadian men and women, after prostate cancer and breast cancer, respectively[252]. Further, an increase in smoking prevalence among youth is a cause for concern, as this will ultimately lead to increases in future lung cancer incidence rates. [221]

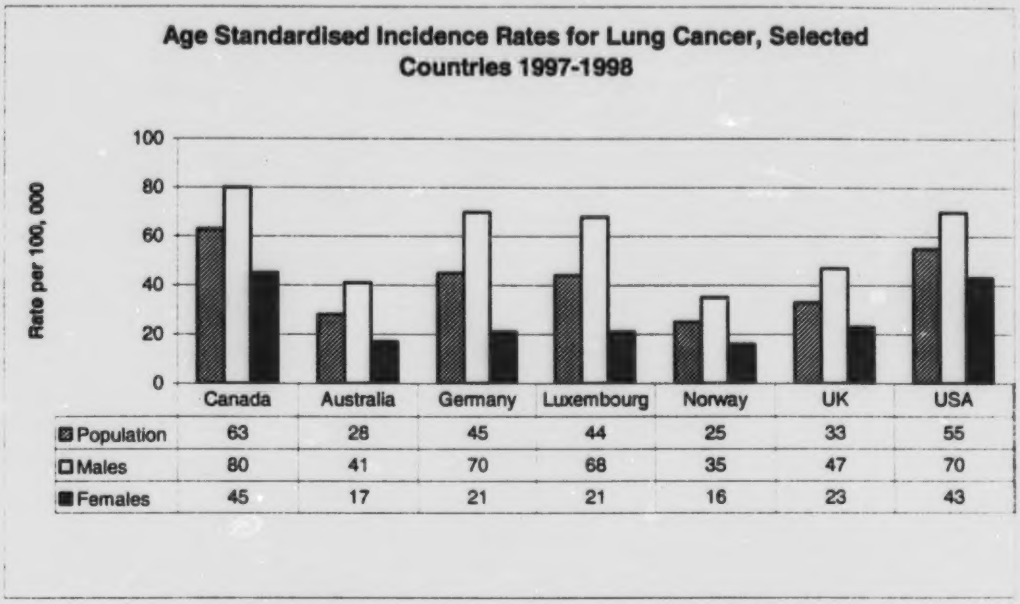
Geographic variations in lung cancer incidence are most likely related to smoking patterns across Canada.

The Saskatchewan Government announced in June, that restaurants and bars are required to designate 30% of their seats to non-smokers by 2002, 40% by 2003 and 60% by 2004 [222]. These new bylaws recognise that exposure to environmental tobacco smoke remains a risk factor for lung cancer, as the same carcinogens to which smokers are exposed are present in the tobacco smoke inhaled by bystanders.

International Comparisons

Only those countries with data from a similar time period as the Canadian data are presented (as opposed to all 23 OECD countries). Data from later years were included if it represented the highest or lowest incidence rates of the international data set. Using the data from the OECD 2001 report, the incidence rate for lung cancer in the Canadian population appears to be similar to that found in the United States, but is higher than those reported for other countries. For example, in 1997-1998, 63 cases of lung cancer are diagnosed for every 100,000 of the population in Canada, as compared to only 25 newly diagnosed cases in Norway.

Figure 126 Lung Cancer Incidence Rate: International Comparison



	Canada	Australia	Germany	Luxembourg	Norway	UK	USA
▨ Population	63	28	45	44	25	33	55
☐ Males	80	41	70	68	35	47	70
■ Females	45	17	21	21	16	23	43

Source: Organization for Economic Cooperation and Development

The gender difference in the incidence of lung cancer appears to be larger in several other countries than it is in Canada. Female rates of lung cancer are consistently smaller than that reported in men from the same country. The incidence rates for Canadian women, however, are higher than in any other country (45 cases per 100, 000) followed closely by the United States (43 cases per 100, 000). The lowest rates of newly diagnosed female lung cancer cases were found in Norway and Australia (16 cases and 17 cases per 100,000 respectively). Similarly low incidence rates in the United Kingdom are perhaps reflective of the fact that smokers in this country started quitting earlier compared to other countries, and thus incidence rates there are declining.

Although these geographic differences may be related to differences in cigarette smoking patterns, variations in screening procedures may also contribute to observable diversity in the incidence rates of lung cancer reported on a population basis. The year that screening programs were initiated with respect to lung cancer detection differs not only within a country, but between countries as well. Higher incidence rates for lung cancer may, therefore, be reflective of the availability of diagnostic procedures, and better screening practices on an international basis, which can identify previously undiagnosed cases in a-symptomatic individuals.

Aside from smoking, environmental factors such as air pollution, and occupational exposure to asbestos, chromium, silica and other hydrocarbons may increase the risk of cancer in persons within certain professions such as industry and mining related occupations. Minimising exposure to dangerous chemicals would contribute to reduced lung cancer incidence. According to research from the Cancer and Palliative Care Unit of the World Health Organization, approximately 60% of cancer cases in Canada are potentially preventable by eliminating smoking and reducing occupational exposure to carcinogens[223].

(b) Potential Years of Life Lost (PYLL)

Trend

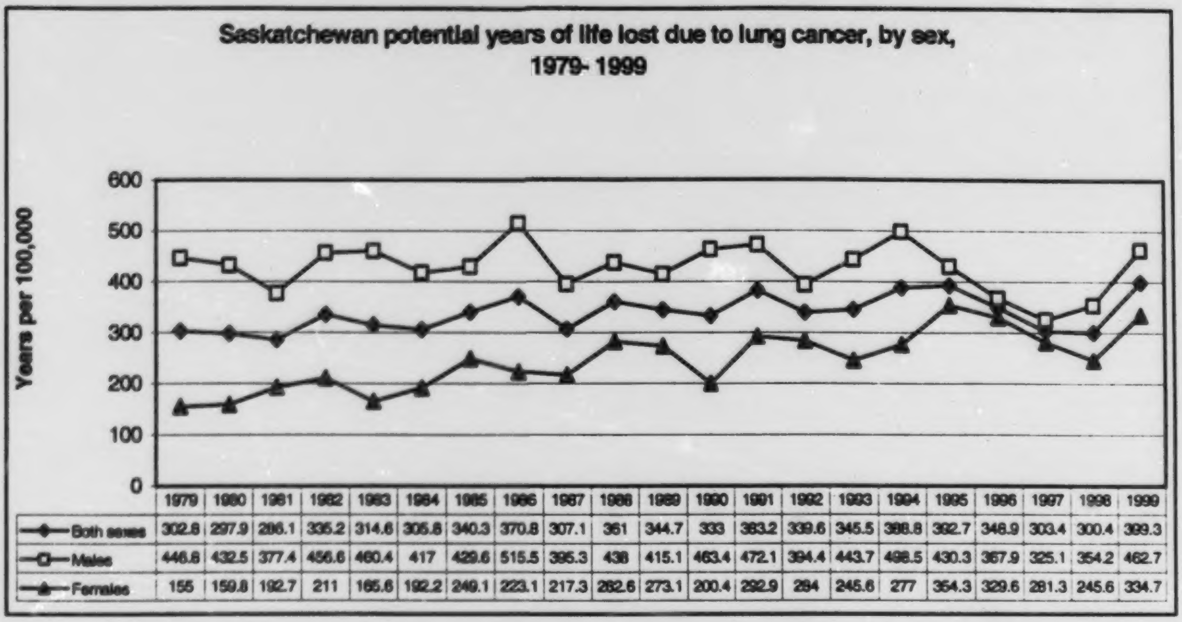
The Potential Years of Life Lost (PYLL) from lung cancer is the leading cause of premature death (i.e., prior to age 75) among all types of cancer. In Saskatchewan, the PYLL from lung cancer increased during the period of analysis, going from 303 years of life lost per 100,000 population in 1979 to 399 years lost per 100,000 in 1999.

Sex

During the 1979-1999 period, males had a higher PYLL rate for deaths due to lung cancer than females, which may reflect the higher incidence rate for lung cancer among males. The PYLL rates were marked by considerable fluctuation. Overall, however, there was an increase in years lost prematurely to lung cancer by both males and females. The male PYLL rate increased from 447 years lost in 1979 to 463 years lost by 1999. During the same time period the female PYLL rate more than doubled, going from 155 years lost in 1979 to 335 years lost in 1999.

One of the reasons cited for the increase in smoking among Canadian women is as a means to avoid weight gain. This is a commonly noted phenomenon that can persist from teenage years onwards. Thus, cancer prevention strategies not only have to address typical issues related to lifestyle (e.g., diet and alcohol consumption) but must also deal with issues around female body image.

Figure 127 Lung Cancer PYLL: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Both sexes	302.8	297.9	286.1	336.2	314.6	305.8	340.3	370.8	307.1	361	344.7	333	383.2	339.6	345.5	388.8	392.7	348.9	303.4	300.4	399.3
Males	446.8	432.5	377.4	456.6	460.4	417	429.6	515.5	395.3	438	415.1	463.4	472.1	394.4	443.7	498.5	430.3	367.9	325.1	354.2	462.7
Females	155	159.8	192.7	211	165.6	192.2	249.1	223.1	217.3	282.6	273.1	200.4	292.9	284	245.6	277	354.3	329.6	281.3	245.6	334.7

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Provincial/Territorial Comparisons

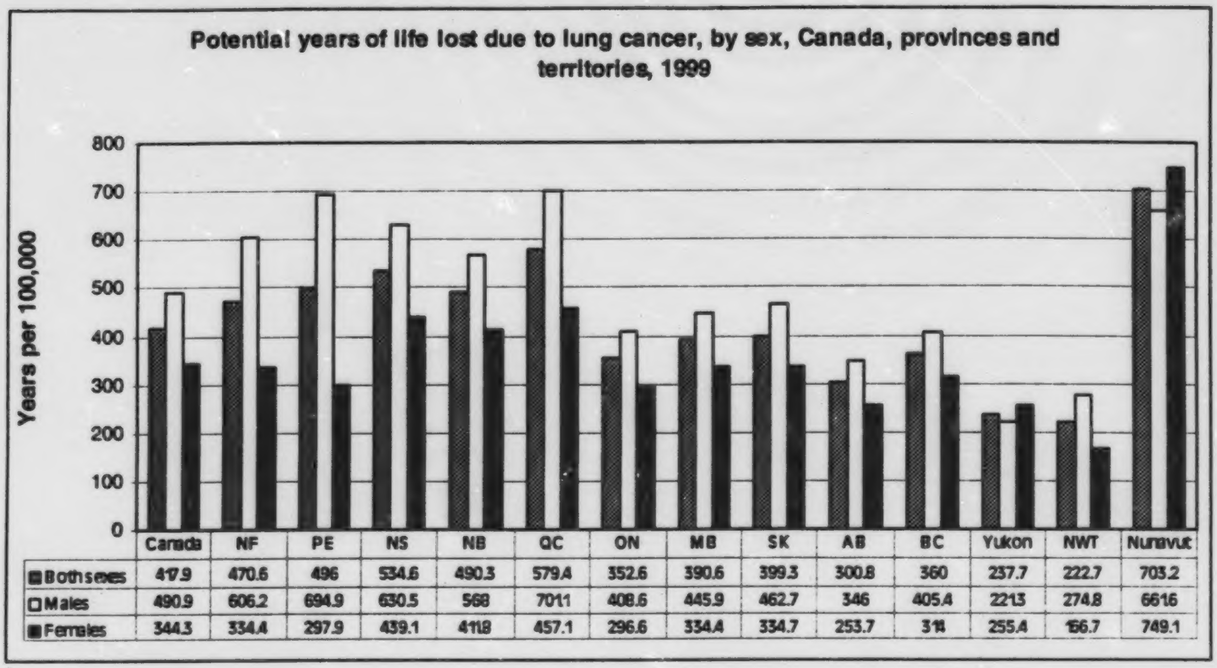
In 1999, provincial and territorial differences in the PYLL from lung cancer varied from a high of 703.2 years of life lost per 100,000 to a low of 222.7 years per 100,000. Saskatchewan was in the middle of the group with a PYLL of 399.3 years per 100,000.

Premature mortality due to lung cancer appears to vary depending on geographic location. In general, provinces in the east tend to have higher rates of PYLL than those found for Ontario and the western provinces. Smoking patterns likely explain much of this geographic variation. In 1999, 30.3 per cent of population aged 12 and over in Quebec, 30 per cent in Nova Scotia, 31 per cent in Prince Edward Island and 28 per cent in New Brunswick were current smokers [vii].

Saskatchewan had the sixth lowest (334.7 per 100,000) PYLL due to lung cancer for females. Northwest Territories had the lowest rate of PYLL due to lung cancer for females in 1999. Similarly Saskatchewan was in the middle of the provinces with the seventh lowest PYLL (462.7 per 100,000) among Canadian men.

[vii] Current smokers are those who smoke on either a daily or an occasional basis.

Figure 128 Lung Cancer PYLL: Provincial Comparison, 1999



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	417.9	470.6	496	534.6	490.3	579.4	352.6	390.6	399.3	300.8	360	237.7	222.7	703.2
☐ Males	490.9	606.2	694.9	630.5	568	701.1	408.6	445.9	462.7	346	405.4	221.3	274.8	661.6
■ Females	344.3	334.4	297.9	439.1	411.8	457.1	296.6	334.4	334.7	253.7	318	255.4	166.7	749.1

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Note: Potential years of life lost for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

The implementation of the National Strategy to Reduce Tobacco Use, with the major aims of prevention, cessation, and protection has lead to the implementation of different interventions at the provincial level. Success in cancer control programs will inevitably lower rates of PYLL in the long term.

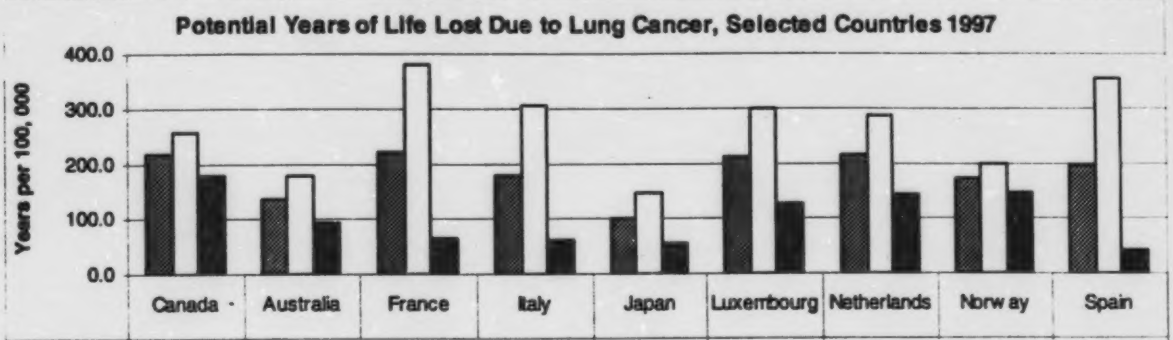
Many factors contribute to smoking behaviour in the first place, such as education, income and social status, which furthermore interact with ethnic background in complex ways. These factors remain the key issues that underlie provincial differences in PYLL due to lung cancer. Smoking has been related to lack of education, low socio-economic status and alcohol consumption. All of these factors are higher for Aboriginal peoples living on and off reserve [224]. The risk factors for dying prematurely from lung cancer are, therefore, elevated in substantial ways by virtue of education, living and working conditions, diet and access to health information, all of which vary considerably with geographic location.

International Comparisons

The OECD 2001 report provides an international dataset for potential years of lost life (PYLL). The definition of PYLL used is based on the years lost prior to age 70, not as 75 as used in the Canadian data.

Cancer is the leading cause of premature death in Canada, and lung cancer represents 26% of the premature mortality caused by cancer (Canadian Cancer Statistics, 2001). In 1997, the rate of lung cancer in Canada was similar to that in several other countries. France (219.7 years per 100, 000), the Netherlands (215.1 years per 100, 000), and Luxembourg (211.8 years per 100, 000) share similarly high rates of PYLL with Canada (217.0 years per 100, 000).

Figure 129 Lung Cancer PYLL: International Comparison



	Canada	Australia	France	Italy	Japan	Luxembourg	Netherlands	Norw ay	Spain
■ Population	217.0	137.8	219.7	179.6	100.1	211.8	215.1	171.4	194.4
☐ Males	257.9	180.4	379.5	307.0	145.3	298.4	287.4	198.4	353.7
■ Females	177.6	94.9	64.5	60.6	56.7	127.8	144.7	145.1	43.2

Source: Organization for Economic Cooperation and Development

Interestingly, the PYLL due to lung cancer is not as high in Canadian men as it is for men living in other countries. For example, France (379.5 years per 100, 000), Spain (353.7 years per 100, 000), Italy (307.0 years per 100, 000), Luxembourg (298.4 years per 100, 000), and the Netherlands (287.4 years per 100, 000) all reported higher rates of PYLL in men than Canada (257.9 years per 100, 000). These rates reflect the younger age at which men develop and die from this disease, and possibly the higher incidence of cigarette smoking in younger men in these countries.

The use of tobacco products remains the single most important cause of preventable, premature deaths due to lung cancer. Differences in the rates of cigarette smoking, and exposure to environmental tobacco smoke remain plausible factors that can account for international variations in the PYLL due to lung cancer observed here.

Although the lung cancer PYLL rates for the population at large are lowest in Japan (100.1 years per 100, 000), the lowest rate of PYLL for females is found in Spain where the PYLL is only 43.2 years per 100, 000. This is considerably lower than the PYLL rate reported in Canada (177.6 years per 100, 000). Again cultural differences in the adoption of cigarette smoking by young women are likely to contribute to the variation in the international lung cancer PYLL rates.

(c) Mortality Rate

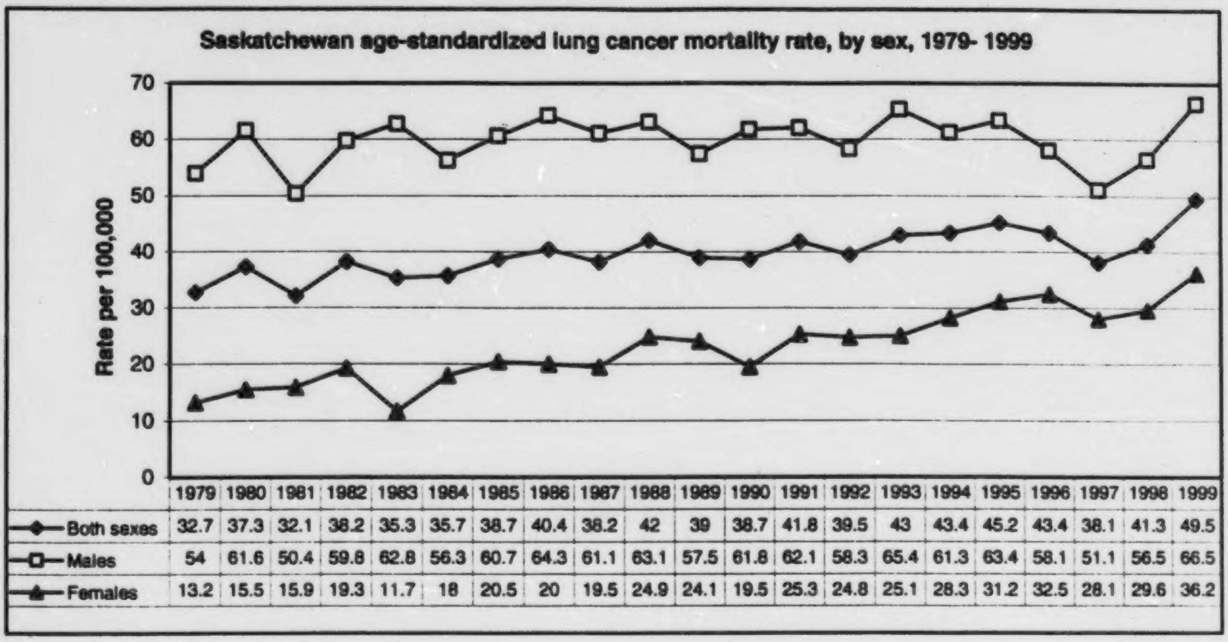
Trend

During the period 1979-1999, the mortality rate for lung cancer in Saskatchewan increased by 51% from 32.7 in 1979 to 49.5 deaths per 100,000 population in 1999. The mortality rates during this period were also marked by fluctuations. For example, the lung cancer mortality rate was as low as 32.1 deaths per 100,000 in 1981. It climbed to 45.2 deaths per 100,000 in 1995, then declined for the next three years before reaching a high of 49.5 death per 100,00 population.

Sex

As seen below, differences exist in the trends for male and female lung cancer death rates. The age-standardized mortality rate for lung cancer in Saskatchewan was higher for males than females during the 21- year period of analysis. Specifically, the mortality rate for lung cancer in males increased by 23%, from 54 to 66.5 deaths per 100,000 population compared with an increase of 174 % (13.2 to 36.2 deaths per 100,000 population) in females. The increase in lung cancer deaths among females may be related to the higher number of female smokers in previous decades. Although the 1999 mortality rate for lung cancer was twice as high among males than females, age-standardized mortality rates by sex have been converging since the late 1980s (when the age-standardized mortality rate for males was three times that for females).

Figure 130 Lung Cancer Mortality Rate: Saskatchewan Trend, 1979-99



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
◆ Both sexes	32.7	37.3	32.1	38.2	35.3	35.7	38.7	40.4	38.2	42	39	38.7	41.8	39.5	43	43.4	45.2	43.4	38.1	41.3	49.5
□ Males	54	61.6	50.4	59.8	62.8	56.3	60.7	64.3	61.1	63.1	57.5	61.8	62.1	58.3	65.4	61.3	63.4	58.1	51.1	56.5	66.5
▲ Females	13.2	15.5	15.9	19.3	11.7	18	20.5	20	19.5	24.9	24.1	19.5	25.3	24.8	25.1	28.3	31.2	32.5	28.1	29.6	36.2

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

At present, no tests or techniques are available that effectively detect lung cancer in its early stages. Although the current treatment regimens, including chemotherapy and radiotherapy, are quite successful for localised tumours, only a small proportion of lung tumours are localised at diagnosis. Therefore, prognosis for lung cancer is poor, with deaths representing more than 66% of new cases [253].

With such a poor prognosis, it is somewhat comforting to know that lung cancer is probably one of the most preventable cancers, with almost 90 per cent of deaths attributable to smoking.[225] The fact that tobacco consumption and lung cancer mortality have followed similar trends highlights the relationship between the two. Factors contributing to the risk of developing lung cancer include the length of time a person has smoked; the amount of tobacco consumed daily, and the tar and nicotine content of the cigarettes. In addition, second-hand smoke or environmental tobacco smoke (ETS) appears to be related to lung cancer in non-smokers.[226]

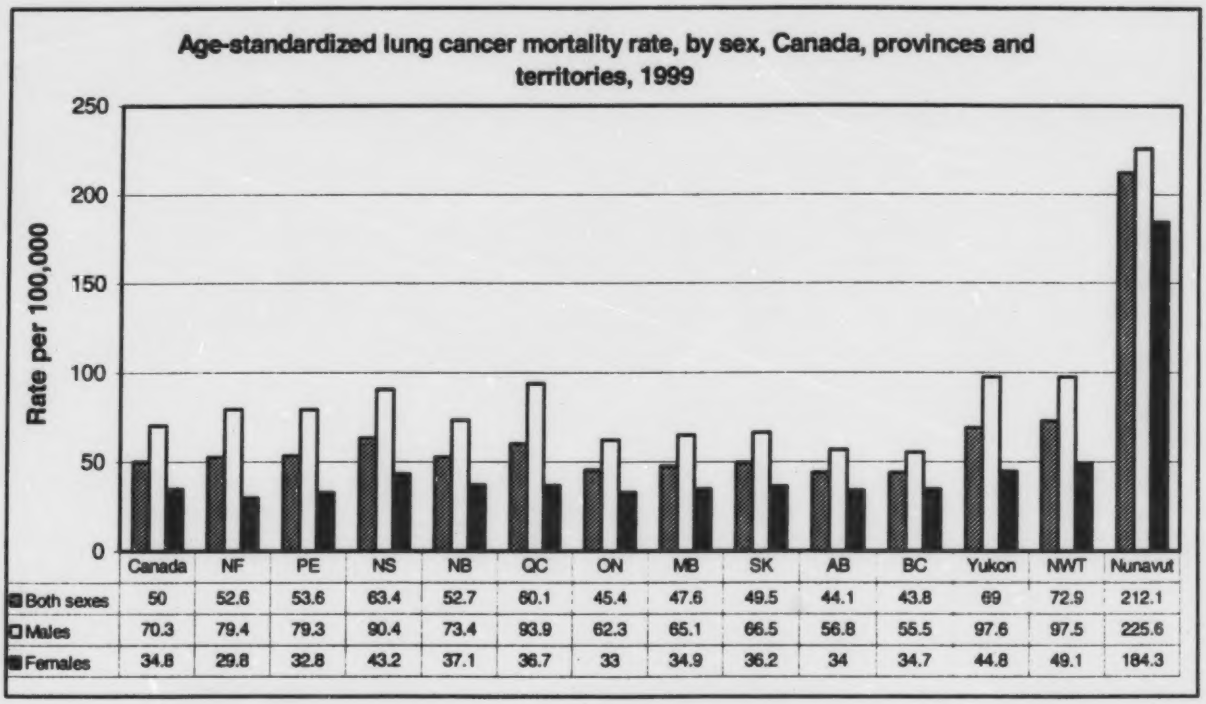
Provincial/Territorial Comparisons

In 1999, Saskatchewan had an age-standardized mortality rate for lung cancer of 49.5 per 100,000, which was comparable to the national average of 50.0 deaths per 100,000. British

Columbia, with a rate of 43.8 deaths per 100,000, reported the lowest lung cancer mortality rate.

Compared to other jurisdictions, Saskatchewan had the fifth lowest lung cancer mortality rate among men and the seventh lowest lung cancer mortality rate among women. British Columbia reported the lowest mortality rate among men (55.5 deaths per 100,000) and Ontario reported the lowest lung cancer mortality rate among women (33.0 deaths per 100,000).

Figure 131 Lung Cancer Mortality Rate: Provincial Comparison, 1999



Age-standardized lung cancer mortality rate, by sex, Canada, provinces and territories, 1999

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	50	52.6	53.6	63.4	52.7	60.1	45.4	47.6	49.5	44.1	43.8	69	72.9	212.1
☐ Males	70.3	79.4	79.3	90.4	73.4	93.9	62.3	65.1	66.5	56.8	55.5	97.6	97.5	225.6
■ Females	34.8	29.8	32.8	43.2	37.1	36.7	33	34.9	36.2	34	34.7	44.8	49.1	184.3

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Note: Age-standardized mortality rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

Prevention of smoking appears to be the key to reducing cancer mortality. Despite consistent warnings on the health risks associated with cigarette smoking, rates of current smokers remain high, and have recently increased among teenagers. The current rate of smoking among youth is likely to cause the mortality rates due to lung cancer to remain elevated into the future. Just as current lung cancer mortality rates reflect the smoking patterns of Canadians in the past, so too will current trends in youth smoking influence those observed over the next twenty years.

Steps to impact the current trend in lung cancer mortality have largely focused on smoking prevention and the elimination or reduction of exposure to tobacco smoke. In most jurisdictions, smoking in the workplace and other public places is prohibited or at least restricted. Greater control over the advertisement of tobacco and placement of health warnings has also been adopted in an attempt to minimise the attraction or status associated with cigarette smoking that can contribute to the adoption of smoking by youth. Aggressive anti-smoking campaigns, including nationally implemented taxes on cigarettes, designed to prevent new generations of smokers, and to further encourage current smokers to quit, remain the most effective tools perhaps in reducing future cancer mortality rates [252].

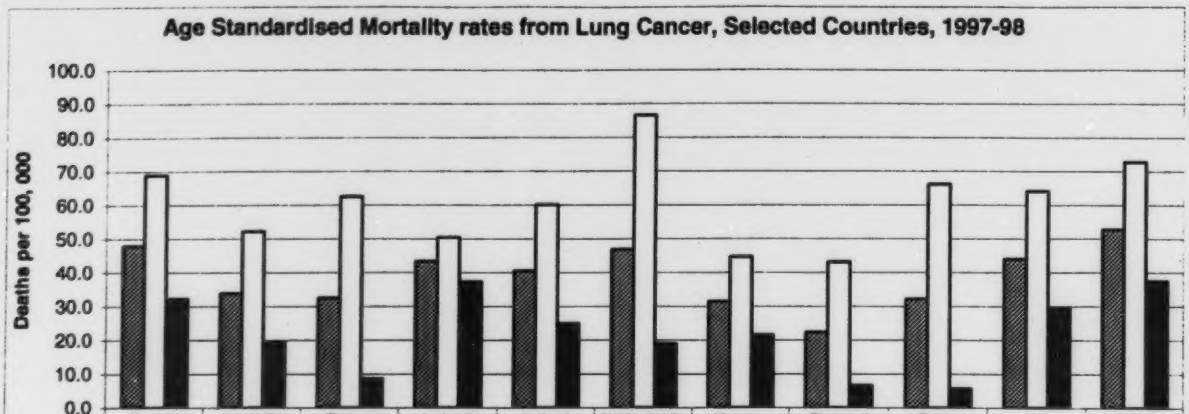
International Comparisons

The OECD population used for calculating age- standardized mortality rates is presented in the international comparisons section on breast cancer.

Age standardized mortality rates are a useful benchmark from which Canadian data can be evaluated with reference to international standards. Using the OECD 2001 report data, the estimates presented include only those countries with data from a similar time period as the Canadian data (i.e., 1997). Data from later years (e.g., 1998) was included if they represented the highest or lowest mortality rates in the international data set.

In comparison to international data, Canadian lung cancer mortality rates for the general population (47.9 deaths per 100, 000) were similar to those found in other developed countries in 1997-98, specifically the Netherlands (46.9 deaths per 100, 000), the UK (44.0 deaths per 100, 000), and the USA (52.6 deaths per 100, 000).

Figure 132 Lung Cancer Mortality Rate: International Comparison



	Canada	Australia	France	Iceland	Ireland	Netherlands	Norway	Portugal	Spain	UK	USA
▨ Population	47.9	33.9	32.5	43.3	40.5	46.9	31.5	22.4	32.2	44.0	52.6
☐ Males	68.9	52.2	62.5	50.4	60.1	86.6	44.7	43.2	66.1	64.1	72.8
■ Females	32.2	19.3	8.6	37.3	24.9	19.0	21.5	6.6	5.7	29.4	37.5

Source: Organization for Economic Cooperation and Development

In 1997, the lowest mortality rates were found in Portugal (22.4 deaths per 100, 000), which is considerably lower than the rates reported for the other countries. Portugal (43.2) and Norway (44.7) had the lowest lung cancer mortality rates among men. Portugal also reported a very low mortality rate from lung cancer for its women (6.6 deaths per 100, 000), as did Spain and France (5.7 and 8.6 deaths per 100, 000 respectively). These rates are particularly low, even when consideration is given to the fact that female rates of mortality from lung cancer are consistently lower than those reported for men.

The difference in mortality rates is most likely due to disparities in tobacco consumption between genders. Declines in smoking are consistently related to the levelling off of lung cancer incidence and mortality rates, and as such remains the most significant modifiable risk factor for decreasing deaths due to lung cancer. Countries where substantial decreases in cigarette smoking occurred in earlier years, or where lower rates of smoking were traditionally recorded, are likely to have reduced mortality rates in comparison to countries where trends towards decreasing tobacco consumption have been a relatively recent event.

Men consistently have higher rates of death due to lung cancer. Canadian men (68.9 deaths per 100, 000) had the third highest mortality rate next to the United States (72.8 deaths per 100, 000) and the Netherlands (86.6 deaths per 100, 000) in 1997 among the selected countries. Similarly for females living in Canada, mortality rates due to lung cancer (32.2 deaths per 100, 000) are the third highest when compared to other countries in 1997-98.

Differences between countries are likely to exist in the reporting procedures used in cancer registration (e.g., the availability of death certificate information), and the diagnostic and screening procedures that lead to early detection and treatment, responsible for reducing mortality rates. However, these comparisons provide useful information from which Canadian data can be evaluated, and may be of some importance in directing future research in the planning of cancer control strategies

(d) Relative Survival Rate

Relative survival rates represent the ratio of observed survival in the group of cancer patients and survival that would be expected had they been only subjected to the mortality rates of the general population with similar characteristics such as age, sex, and geographic location. The time period over which relative survival rates have been considered in this document is five-years.

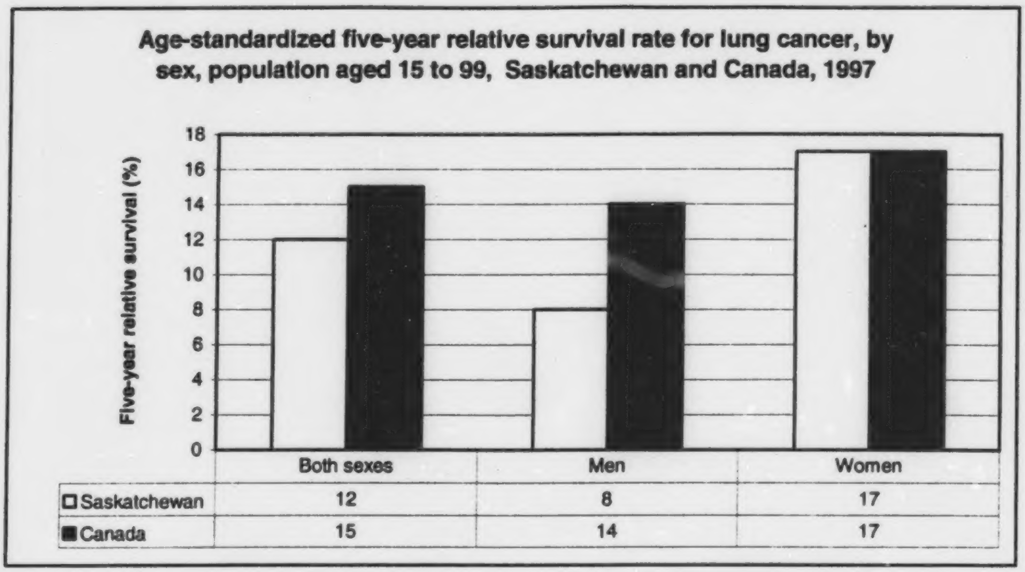
Trend

In 1997, Saskatchewan's age-standardized five-year relative survival rate for lung cancer (12 per cent) was lower than the national average (15 per cent). This means that in Saskatchewan, 12 per cent of individuals aged 15 to 99 diagnosed with lung cancer in 1992 were likely to live another five years, compared to 15 per cent for Canada as a whole.

Sex

The age-standardized five-year relative survival rate for lung cancer was higher for women (17 per cent) than for men (8 per cent) in Saskatchewan. While there was no difference in the five-year relative survival rate between Saskatchewan and Canadian women (17 per cent), men in Saskatchewan aged 15 to 99 diagnosed with lung cancer had a five-year relative survival rate of only 8 per cent compared with 14 per cent of Canadian men in general.

Figure 133 Lung Cancer Relative Survival Rate: Saskatchewan & Canada by Sex, 1997



	Both sexes	Men	Women
☐ Saskatchewan	12	8	17
■ Canada	15	14	17

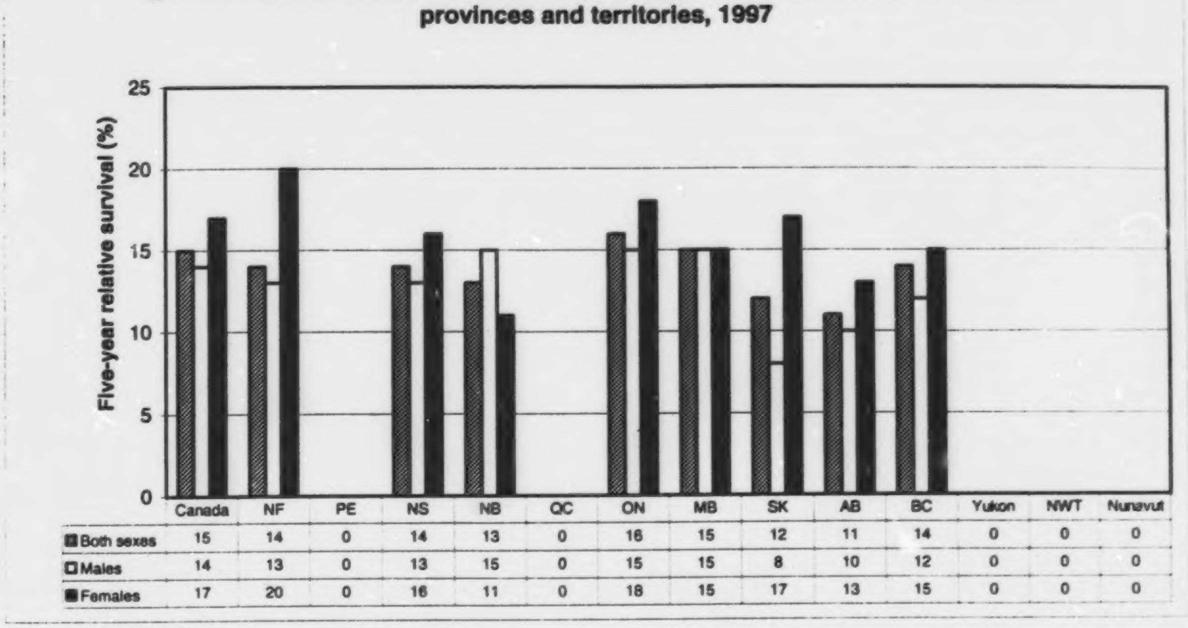
Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian provincial life tables (1990-1992); ISQ

Provincial/Territorial Comparisons

Of all the provinces and territories, Saskatchewan had the second lowest age-standardized five-year relative survival rate for lung cancer at 12 per cent, below the national rate of 15 per cent.

The age-standardized five-year relative survival rates for lung cancer in 1997 were higher for women than men in all the provinces, except New Brunswick where men had a five-year age-standardized five-year relative survival rate of 15 per cent and women had a rate of 11 per cent.

Figure 134 Lung Cancer Relative Survival Rate: Provincial Comparison, 1997



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	15	14	0	14	13	0	16	15	12	11	14	0	0	0
☐ Males	14	13	0	13	15	0	15	15	8	10	12	0	0	0
■ Females	17	20	0	16	11	0	18	15	17	13	15	0	0	0

Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian and provincial life tables (1990-1992); ISQ

Note: Quebec data were not included in the national estimates of five-year relative survival because their method of ascertaining the data of diagnosis of cancer differs substantially from that of other provincial cancer registries. Results for Prince Edward Island, the Yukon Territory, the Northwest Territories and Nunavut are not shown because of an insufficient number of cases for analysis. Cases from these are, however, included in the national estimates.

As mentioned above, the fact that lung cancer remains the most difficult cancer to detect and screen for contributes to its high mortality rates, and reduces chances of surviving the disease. As with other cancers, the earlier that the disease can be detected and treated the better the prognosis is for outcome. Currently there is no single chemotherapy regimen that is recommended for treating lung cancer and most treatments only aid symptoms for short durations [227]. Although a 70% cure rate for patients with localised stage 1 tumours is noted, very few of lung cancer cases are actually diagnosed at this stage [247].

The available provincial and territorial relative survival rates presented above does not show much variation; therefore, it is difficult to attribute differences to access to treatments. Differences in the way jurisdictions collect data, especially in the ascertaining of a diagnosis, makes survival rates among the provinces difficult to compare. Regardless, the fact that lung cancer has the lowest survival rate of all cancers highlights the role that preventing the development of this form of cancer in particular plays in reducing the social and economic burden that this disease poses for the population at the national level.

International Comparison

No comparable data is currently available for international comparisons of relative survival rates for lung cancer.

CHAPTER 5: A STORY ABOUT HEALTH SERVICES

5.1 Age Related Services

This section focuses on three measures of health services that are by their very nature specific to Canada's senior population. These measures include, hip and knee replacement rates and home care admissions.

For the purposes of this report the age standardized rate of total unilateral or bilateral hip and knee replacement surgery performed on in-patients in acute care hospitals are looked at.

Disabling arthritis of the hip, caused by prolonged wear and tear of the ball and socket hip joint, can significantly reduce quality of life. This damage can be repaired by surgical procedures, such as total hip arthroplasty (THA), in which man-made materials replace all or parts of the hip joint. The prevalence of arthritis-related disability and pain has already made the demand for hip replacement surgery in Canada overwhelming. Recent statistics from the Canadian Institute for Health Information indicate that patients age 50 and over account for 91 per cent of hip replacement surgeries[228], therefore, increases in the aging population may also lead to an increased demand for corrective surgery for age-related disease such as osteoarthritis.

Although there are risks associated with hip replacement surgery, primarily from infection and blood clot formation (deep vein thrombosis), the rates of surgery have increased substantially over the past two decades. This has predominantly been due to a reduction in the risk associated with adverse outcomes, resulting from improved surgical techniques and after care. The use of anti-coagulant medications after surgery is now commonplace as a preventive measure against the formation of blood clots. Furthermore, evaluation before an operation to identify other medical problems can reduce the risks associated with anaesthesia that is common in the elderly and those with pre-existing medical problems. These risks associated with joint replacement can now be controlled substantially.

Knee pain can severely impede a person's level of activity. Major advancements in artificial knee replacement over the last 25 years have improved the outcome of total knee replacement surgery (TKR) greatly. Artificial knee replacement surgery is becoming more and more common as both the technology for delivering this procedure improves and the demand for it grows with the ageing of the Canadian population. Osteoarthritis is the most common cause of degeneration specific to the knee joint, and is predominantly what leads to the need for knee replacement surgery[229]. Excessive wear and tear of the knee joint can also be caused by abnormalities of knee joint function resulting from fractures of the knee, torn cartilage/ligament and other injuries, which cause degeneration of the joint many years after the initial injury was sustained. As with hip replacements, knee replacement surgery is also on the rise, with the majority of procedures being performed on people aged 55 and older. This rising trend is likely to continue as the population ages.[230] The Canadian Joint Replacement Registry, a database used to monitor trends in joint replacement surgery will provide the information necessary to measure and improve the delivery and outcome of total joint replacement surgeries in Saskatchewan and across the country, which may in time improve the quality and distribution of those services.

The risks associated with knee replacement surgery are similar to those for other joint replacement procedures. The risks associated with deep vein thrombosis have been minimised by the use of anti-coagulant medications as a preventive measure against the formation of blood clots. Furthermore, evaluation to identify other medical problems before an operation, such as heart disease or lung conditions, can reduce the risks associated with anaesthesia that are common in the elderly and those with pre-existing medical problems.

Another factor that contributes to expected outcomes in joint replacement surgery, including total knee replacement surgery, is the age of candidates for the surgery. In the past patients were generally aged between 60 and 75 years, however, this has been expanded more recently to include patients of older, as well as younger ages. The inclusion of these groups has the potential to alter the outcomes associated with the surgery. For older patients, pre-existing co-morbidities are more likely, and this fact alone, not the knee replacement surgery per se, is what likely contributes to poorer outcomes. Younger patients, especially those under age 55 years, are likely to expose their implants to a greater degree of mechanical stress over an extended time period in comparison to older individuals, and again this can contribute to the need for revision surgery to replace or mend original implants.[231]

Limitations to hip and knee replacement measures

Joint-replacement surgery has become relatively routine, because it has been indicated as a cost-effective means for restoring quality of life. A recent Ontario study found that total hip replacements have risen by 22% in a six-year period[232]. Figures from the Canadian Joint Replacement Registry show increases in the total hip and knee replacement surgery rate over a six-year period (1994/95 to 1999/2000). Total hip replacements have increased by 19.4% and total knee replacements increased by 45.2% [233]. Indeed, it can be projected that as Canada's population ages, and grows, the demand for general orthopaedic surgery, particularly joint replacements, will become even greater.

Although the demand for orthopaedic care is rising, the number of orthopaedic surgeons in Canada is declining. There are not enough new surgeons to replace the ones who are emigrating (usually to the U.S.), retiring or dying [234]. This may or may not be a factor in Saskatchewan. Wait times for arthritis patients for appointments, physician consultations, and treatment may be affected by the difficulty experienced in getting access to diagnostic equipment, operating rooms and hospital beds.

Inter-regional variation in the hip replacement rate may be attributable to numerous factors of which the availability of services is but one. Shortages of other health professionals such as nurses, anaesthetists, physiotherapists and occupational therapists may be factors in the provision of hip and knee replacement surgeries in some areas of Canada.

(a) Total hip and knee replacement rate

Limitations

Due to limitations of existing databases, intervention rates for joint replacement are being used as surrogate indicators of health-related quality of life for reporting in 2002.

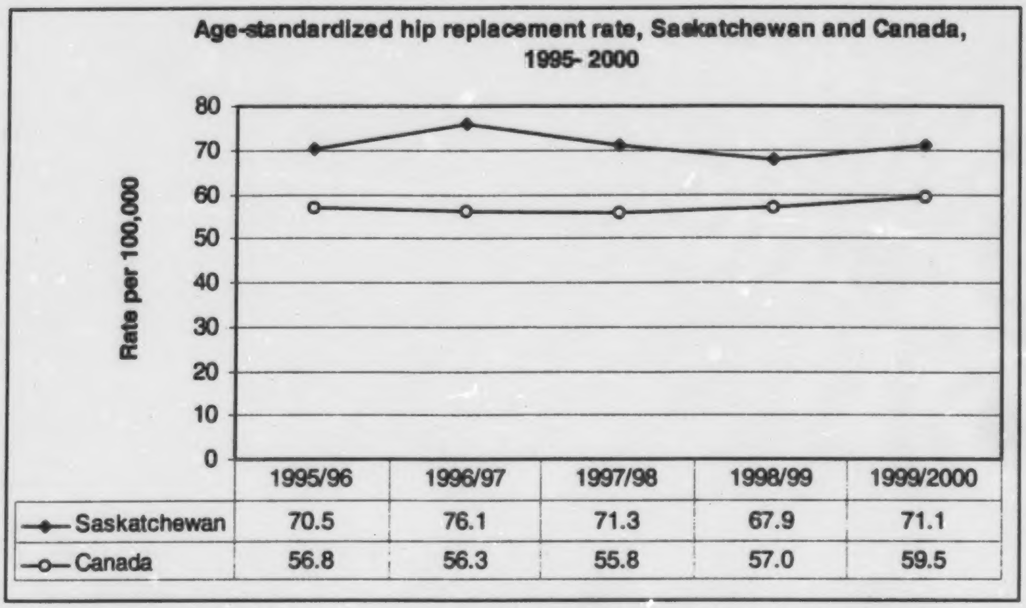
Hip replacement surgery could be used as a health-related quality of life measure because freedom from pain and restored ability to perform normal and desired activities after surgery are often used as evidence of an improvement in individual quality of life. However, questions have been raised about the optimal quality of life level for this age-sex standardized measure, and in particular whether a higher rate of hip replacement is always a good measure of health-related quality of life.

Hip Replacement

Trend

Saskatchewan has experienced higher rates of age-standardized hip-replacement surgery than the national average consistently from 1995/1996 through to 1999/2000. Although the rate of hip replacement surgery has remained relatively stable in Saskatchewan in this time (70.5 per 100, 000 in 1995/96 to 71.1 per 100, 000 in 1999/2000), these rates are still above that observed at the national level.

Figure 135 Hip Replacement Rate: Saskatchewan Trend, 1995-2000



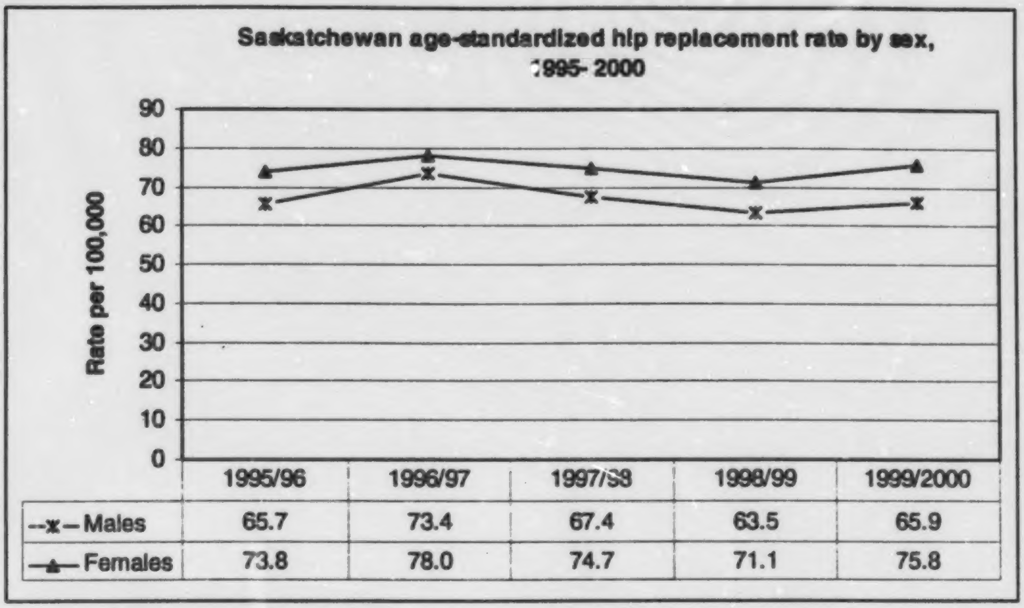
	1995/96	1996/97	1997/98	1998/99	1999/2000
—◆— Saskatchewan	70.5	76.1	71.3	67.9	71.1
—○— Canada	56.8	56.3	55.8	57.0	59.5

Source: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

Sex

Age-standardized hip replacement rates have been higher for females than for males in Saskatchewan across all points of time observed. In 1995/96 the gap between these two rates was quite large (8.1) as females had a rate of 73.8 per 100,000 compared with 65.7 per 100,000 for males. The gap between the male and female hip replacement rates narrowed to 4.6 per 100,000 in 1996/97 and has subsequently widened to 7.3 in 1997/98 and 9.9 in 1999/2000.

Figure 136 Hip Replacement Rate: Saskatchewan Trend by Sex, 1995-2000



	1995/96	1996/97	1997/98	1998/99	1999/2000
--x-- Males	65.7	73.4	67.4	63.5	65.9
—▲— Females	73.8	78.0	74.7	71.1	75.8

Source: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

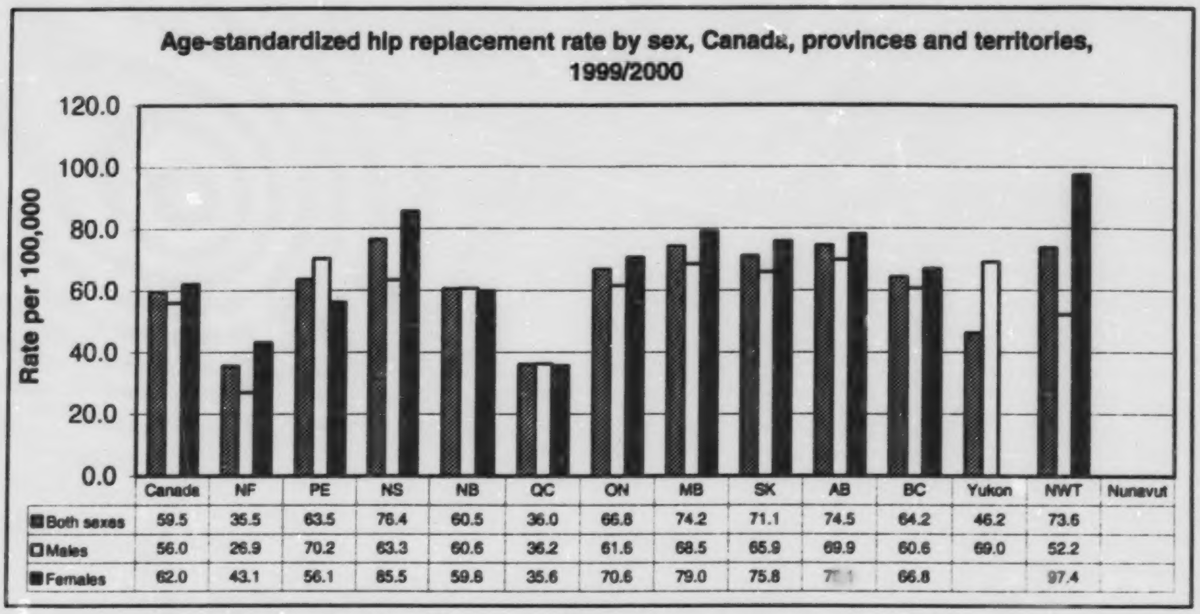
Provincial/Territorial Comparisons

In 1999-2000, Saskatchewan had an age-standardized hip replacement rate of 71.1 per 100,000 considerably above the average for the Canadian population as a whole.

The trend in Saskatchewan of females generally having a higher rate of hip replacement than males has been consistent across almost all the provinces, excluding Prince Edward Island, New Brunswick and Quebec. In New Brunswick and Quebec, females were marginally lower than those of males.

Saskatchewan had the fifth highest hip replacement rate for men (65.9) and women (75.8).

Figure 137 Hip Replacement Rate: Provincial Comparison, 1999-2000



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	59.5	35.5	63.5	76.4	60.5	36.0	66.8	74.2	71.1	74.5	64.2	46.2	73.6	
☐ Males	56.0	26.9	70.2	63.3	60.6	36.2	61.6	68.5	65.9	69.9	60.6	69.0	52.2	
■ Females	62.0	43.1	56.1	85.5	59.8	35.6	70.6	79.0	75.8	[illegible]	66.8		97.4	

Source: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

Note: All the data for Nunavut and Yukon females were suppressed due to small numbers.

Saskatchewan's rate of hip replacement surgery remains higher than the national average. In providing this surgery, there are a number of challenges the health system faces. As in many other provincial and national jurisdictions, the issue of waiting times is one of the greatest problems the health system faces in providing this treatment.[235] Growing demand for orthopaedic care represents a considerable challenge to the Canadian health care system.

International Comparisons

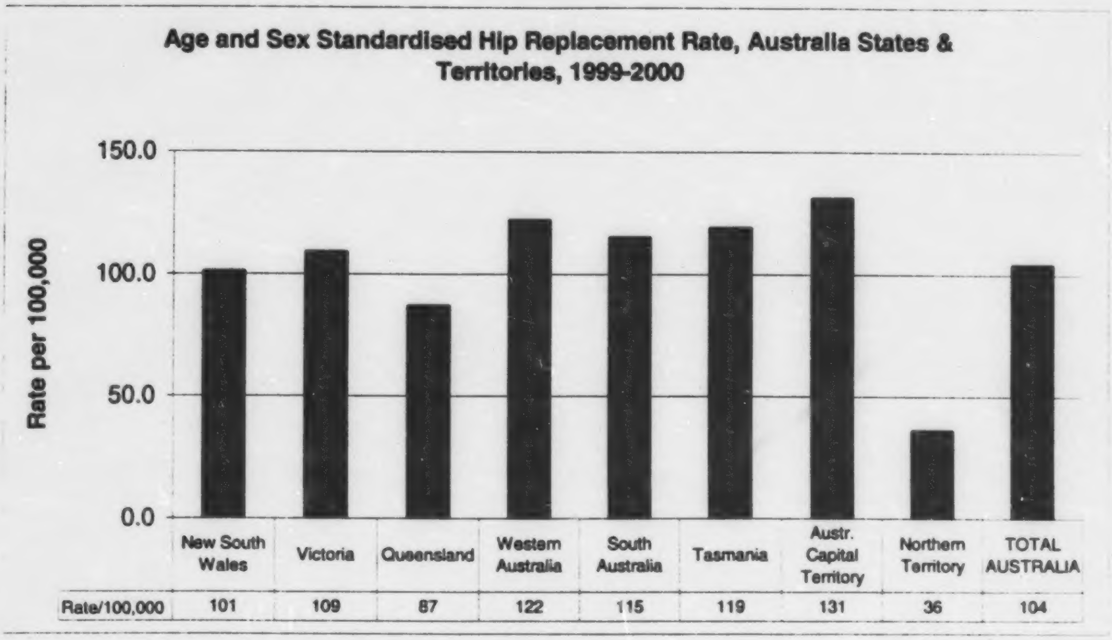
Although limited comparisons can be made with respect to this indicators status internationally, the Australian data provides some context to the information on hip replacement in Canada.

The Australian Institute of Health & Welfare (AIHW) 2001 report summarizes recent data (1999-2000) on hip replacements by state or territory of usual residence within Australia. Data were obtained from the National Public Hospital Establishments Database and the National Hospital Morbidity Database that provides reasonably good coverage of Australian hospitals. Although estimates are available for Australia only, these rates are standardized to a population with an age/sex structure similar to the Canadian population[236]. The Australian estimates, however, are based on rates per 1,000, whereas Canadian data is based on rates per 100,000 population.

When Australian data is converted to rates per 100,000 it appears that hip replacements occur more frequently in Australia than in Canada.

On average, 104 hip operations per 100, 000 population were performed in 1999-2000 in Australia compared to 59.5 in Canada. However, there was some variability in the Australian data with respect to different provinces and territories. The lowest rate of hip replacement is noted in the Northern Territories (Australia), (36 replacements per 100,000), which is most similar to that reported in Quebec (36.0) and Newfoundland (35.5).

Figure 138 Hip Replacement Rate: International Comparison



Source: Australian Institute of Health & Welfare, 2001

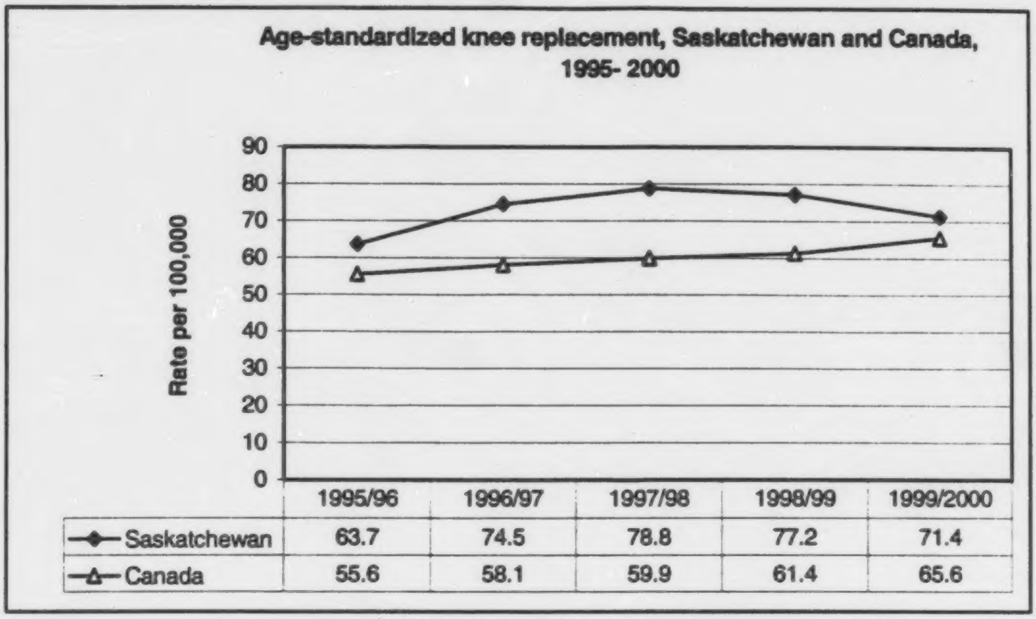
Knee Replacement

The rate of knee replacements in Saskatchewan has generally been recorded as being slightly above the national average rate for both genders (1999/2000), and higher than that found in several other provinces (namely Newfoundland, Prince Edward Island, Quebec, and British Columbia). There is some suggestion that the rate of knee replacement surgery may be related to length of hospital stay. Saskatchewan's average length of stay after knee surgery was 9.1 days, which is shorter than the average 12 to 13 days reported in provinces with lower rates of knee replacement [237].

Trend

Over the last five years the age-standardized knee replacement rates for Saskatchewan experienced an observable rise followed by a slight downward trend. Between 1995/96 and 1997/98 rates rose from 63.7 knee replacements per 100,000 population to a rate of 78.8. During the two subsequent years, the rates fell to 71.4 knee replacements per 100,000 population. During this same five-year period, the national trend in knee replacement surgeries has been a steady climb from 55.6 surgeries per 100,000 to 65.6 surgeries per 100,000. On a percentage basis, the Saskatchewan rate of knee replacement surgeries has increased overall by 12.1% while the national rate has increased by 18.0% for this five year period. This has resulted in the Saskatchewan rate of knee replacement surgeries being very similar to the national average.

Figure 139 Knee Replacement Rate: Saskatchewan Trend, 1995-2000



	1995/96	1996/97	1997/98	1998/99	1999/2000
—◆— Saskatchewan	63.7	74.5	78.8	77.2	71.4
—△— Canada	55.6	58.1	59.9	61.4	65.6

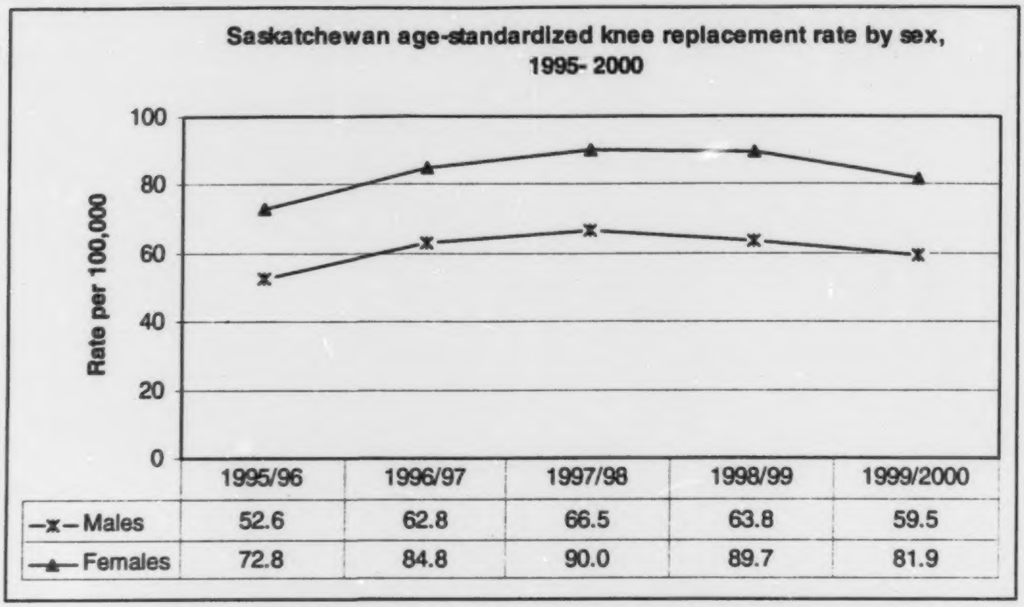
Source: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

Sex

In a manner consistent with the provincial trend, the Saskatchewan age-standardized knee replacement rates for both males and females have experienced a period of significant growth followed by a period of slight decline. During this time frame, the females have maintained a consistently higher rate of knee replacement compared to males. As presented in the graph below, the male and female knee replacement rates present as two nearly parallel bows ranging from rates of 52.6 to 59.5 (knee replacements per 100,000 population) for males and 72.8 to 81.9 for females.

Over the entire five-year period 1995/96 to 1999/00, the male knee replacement surgery rate has grown by 13.1 percent while the female rate has grown by 12.5 percent.

Figure 140 Knee Replacement Rate: Saskatchewan Trend by Sex, 1995-2000



	1995/96	1996/97	1997/98	1998/99	1999/2000
–x– Males	52.6	62.8	66.5	63.8	59.5
–▲– Females	72.8	84.8	90.0	89.7	81.9

Source: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

Provincial/Territorial Comparisons

There is a great deal of variation in the age-standardized knee replacement rates per 100,000 population amongst the provincial and territorial jurisdictions. Even among the three prairie-provinces; Manitoba, Saskatchewan and Alberta; the rates vary from 94.5 to 71.4 knee replacements per 100,000 population.

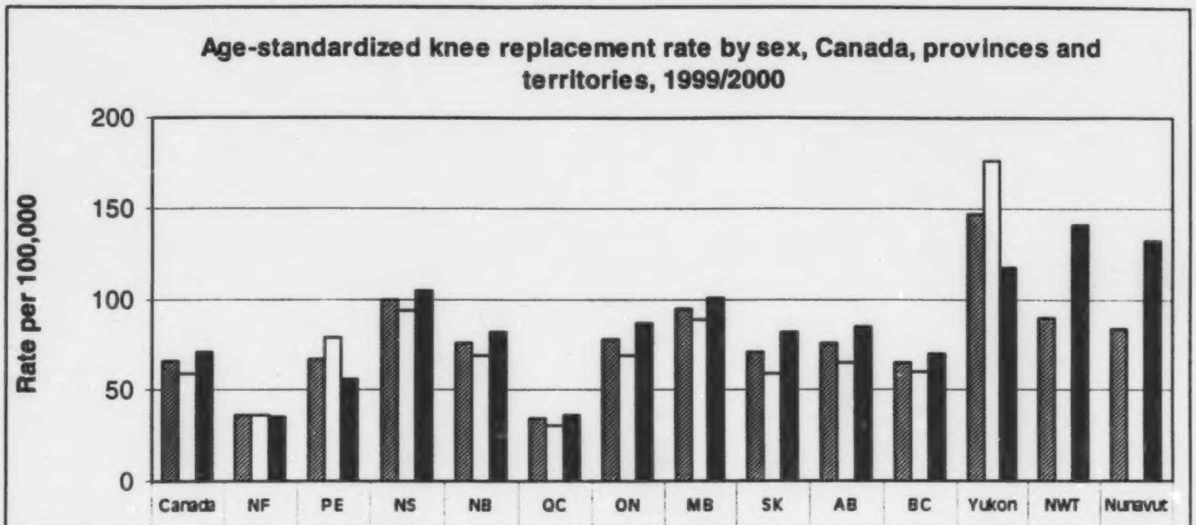
There are six provinces that have rates of knee replacement that hover around the national average. This group includes, Ontario (78.2), Alberta and New Brunswick (75.8), Saskatchewan (71.4), Prince Edward Island (67.1) and British Columbia (65.0).

Of all the provinces and territories, Saskatchewan had the fifth lowest (71.4) age-standardized knee replacement rate in 1999/2000.

Contrary to the general pattern where the knee replacement rate for males was lower than females, the age-standardized knee replacement rates for males were higher than females in Newfoundland, Prince Edward Island and Yukon. Saskatchewan had the third lowest (59.5) age-standardized knee replacement rate for males. Saskatchewan had the sixth lowest (81.9) age-standardized knee replacement rate for females.

The number of females undergoing knee surgery in the province outnumbers males, and has done so consistently since 1995/1996 (see Figure 141). This trend is also found to be relatively constant throughout the country, with the exception of Prince Edward island and the Yukon where male rates tend to be higher than females, and in Newfoundland where virtually no differences is apparent in the rates of knee surgery between males and females. The growing demand for orthopaedic care represents a considerable challenge to the Canadian health care system.

Figure 141 Knee Replacement Rate: Provincial Comparison, 1995-2000



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Both sexes	65.6	36.2	67.1	99.1	75.8	34.2	78.2	94.5	71.4	75.8	65.0	146.6	89.3	83.7
☐ Males	59.0	36.9	79.1	93.2	69.1	31.0	68.8	88.7	59.5	64.9	59.9	176.6		
■ Females	71.4	35.9	56.1	104.5	81.4	36.5	86.7	100.3	81.9	85.2	69.9	117.5	141.1	131.9

Source: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

Note: Data for males in the Northwest Territories and Nunavut were suppressed due to small numbers.

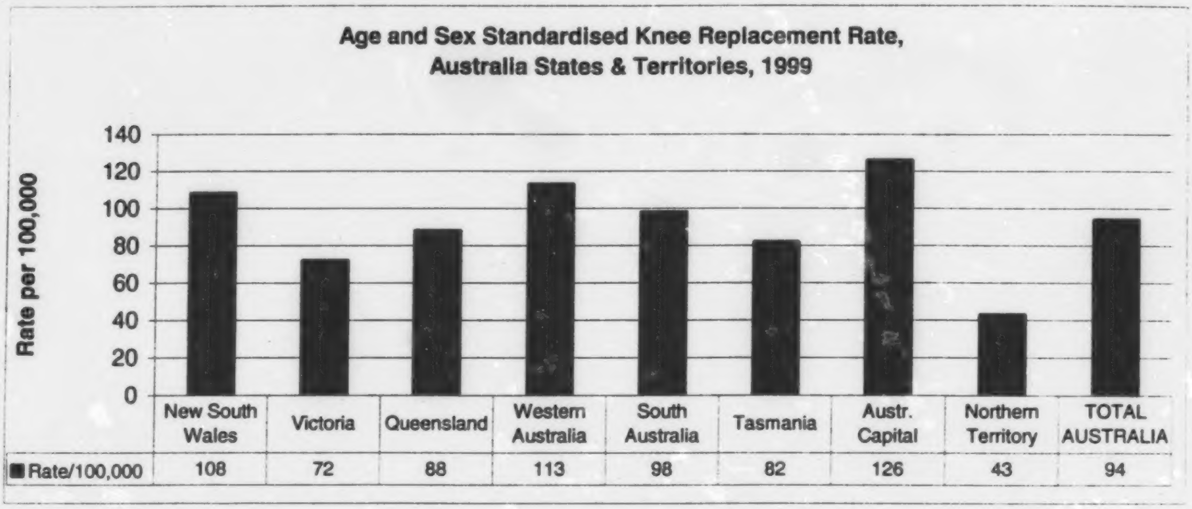
International Comparisons

The limited information available on knee replacements from other countries prohibits comparisons being drawn. However, the rates from Australia presented here provide some context with reference to current information on the extent of knee replacement operations in Canada.

The Australian Institute of Health & Welfare (AIHW) 2001 report summarizes recent data (1999-2000) on knee replacements by state or territory of usual residence within Australia. Data were obtained from the National Public Hospital Establishments Database and the National Hospital Morbidity Database that provides reasonable good coverage of Australian hospitals. Although estimates are available for Australia only, these rates are standardized to a population with an age/sex structure similar to the Canadian population [238]. The Australian estimates, however, are based on rates per 1,000, whereas Canadian data is based on rates per 100,000 population.

The converted Australian rates per 100,000 suggest that knee replacement is higher in the Australian population (94.0 per 100, 000) than it is in the Canadian population (65.5 per 100,000).

Figure 142 Knee Replacement Rate: International Comparison



Source: Australian Institute of Health & Welfare, 2001

(b) Home care admissions

Limitations

In Canada, home care refers to an array of services, designed to enable clients who are partially or wholly incapacitated to live at home. This is done with the hope that it will delay, prevent or become a substitute for long-term care or admission to acute care facilities [266]. Consequently, the number of services that home care encompasses are diverse, ranging from help with the activities of daily living, to addressing needs associated with a specific medical diagnosis, and may also include social and educational visits. As such the number of people that can be reached by such services is also varied. Homecare is appropriate for people with minor health problems and disabilities to those who are acutely ill. Furthermore, although use of the health care system tends to increase with age, there are no upper or lower limits as to the age at which home care services can be accessed [239].

Although providing better home services to more people, this diversity in the range and orientation of services creates difficulties when comparisons between provinces and territories are being made. Provincial and territorial definitions of home care differ and include a diverse range of services. Publicly funded home care programs exist in every province and territory in Canada, as does the jurisdictional responsibility for providing home care services. Since each program has undergone its own unique development in response to community needs, service delivery varies across the country. The lack of commonality in standards for service delivery and information collection makes comparison difficult and makes it hard to share best practices[266].

Home care admissions as an indicator of quality of care

Admissions to publicly funded home care services, including home health and home support services, provides some indication of the progress made in implementing programs that deliver some health services to people in their homes, as an alternative to admitting people to acute care or long term care facilities. However, it could be argued that actual volumes of service may be a better indicator than admissions themselves.

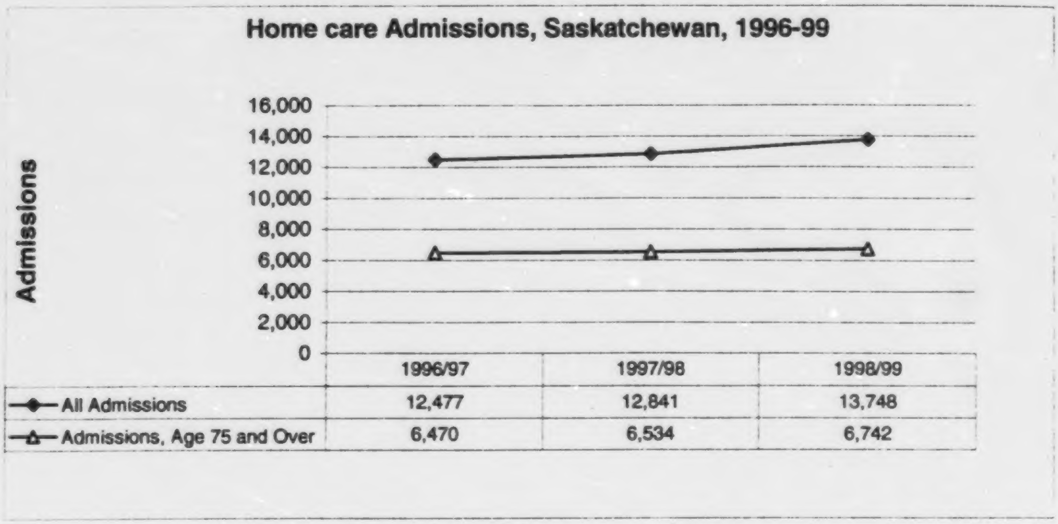
Home care services have several benefits: greater individual life style choices and independence is maintained for as long as possible; facility spaces can be reserved for those with greater health care needs; and furthermore, lower costs are often associated with home care, compared to care in institutions.

Volume measures by themselves cannot show if, or how well these needs are being met by home care programs. Nor can they show how many people have not had their needs met. Comparisons with trends in the utilization of facility-based services per capita (such as acute care admissions and long term care) are needed, because if high quality home care services are in place a corresponding decrease in the need for acute care admissions or long term care for people with certain chronic health conditions would be expected. Reporting data on these expected impacts of home care programs along with volume indicators of home care use provides an indirect way of gauging the quality of home care programs.

Trend

Historical data is included for all admissions to home care services between April 1 and March 31, inclusive, for the indicated fiscal years (1996-99). Data for the 1999-2000 period and beyond were unavailable at this time. Clients who were discharged then readmitted within the fiscal year are counted twice for that year.

Figure 143 Home Care Admissions: Saskatchewan Trend, 1996-99



	1996/97	1997/98	1998/99
◆ All Admissions	12,477	12,841	13,748
△ Admissions, Age 75 and Over	6,470	6,534	6,742

Source: Saskatchewan Health Home Care System.

Note: Total admissions rather than rates are provided. Although rates are more useful for making comparisons, no comparisons are available for this data, therefore, a measure that provides a clearer picture of the trend (total admissions) was used.

Home care admissions for individuals of all ages in Saskatchewan have increased from 1996/97 to 1998/99. This may be a factor of an increasing trend to deliver services in the community rather than in institutions, as well as increases in home care funding. Trends for individuals over the age of 75 years are similar to the population as a whole, although less dramatic.

Home Care in Saskatchewan

Saskatchewan introduced a comprehensive home care program in 1978. Prior to 1993, not-for profit home care boards administered home care programs. In 1993, T*he Health Districts Act* was passed, whereby authority for the delivery of home-based services was given to not-for profit district health boards [240]. This was updated in 2002, when *The Regional Health Services Act* was passed whereby authority for the delivery of home-based services has now been given to regional health authorities. Services are provided on the basis of assessed need and are intended to help people who need acute, palliative and supportive care to remain independent at home. Comprehensive standards also exist for the provision of home care that covers nursing care, meal service, and home making amongst others.

Saskatchewan Health allocates funds for home care to regional health authorities and they are responsible for service delivery and monitoring.

Previous studies of home care users, based on cross-sectional data from the first cycle of the National Population Health Survey (1994/95), examined the health and demographic characteristics of users of all ages [241]. Age is a factor that distinguishes people who enter home care, as the likelihood of home care entry was higher for older seniors than for those aged 65 to 74.

Income also appears to play a role, however, as a significantly higher percentage of lower-income individuals entered home care than did those with higher-incomes. This may be partly due to lifestyle factors that impact upon health status, and play a role in poorer health outcomes, which in turn create a greater need for care that is experienced by individuals in lower income categories. Furthermore, individuals with higher incomes are more able to pay for private services, rather than being dependent on government-subsidized home care [242].

Over and above these factors, and those associated with observed need, such as the presence of chronic conditions, prior hospitalization in the last 12 months etc., changes in social support are also plausibly related to homecare entry. Decreases in family contact, and seniors who had recently begun living alone are identified as conditions under which individuals were more likely to enter homecare than were individuals who experienced no change in their social conditions [270].

Since the type of care that the family can provide changes over time, and with the nature of the person's illness or state of functional decline, it is likely that provincial differences in the nature of homecare services offered, and the demographic breakdown of the elderly impact admissions to homecare. Provinces with large numbers of very old people (i.e. those older than 75 years) are likely to have higher home care admissions, as the type of care these individuals need often is no longer within the boundaries of what their families can provide. Regional differences in the range of home care services provided may also potentially result in variability in home care entry rates.

Geographical location too also influences the proportion of people who can access home care. In widely dispersed populations it is more difficult to arrange services at home because of the travel and cost involved in caring for a single individual or family.

As the Canadian population ages, home care is obtaining increasing attention as a means of improving quality of life and of easing the financial and operational demands on the health system. The effectiveness of these services in terms of improving overall health, longevity and quality of life requires further careful evaluation.

5.2 Access to Services

The size of surgical waiting lists, and the length of time some people are waiting for certain non-emergent surgery, is a concern in Saskatchewan, as it is across the country. In August 2001, the Minister of Health appointed an external team to review waitlist initiatives and recommend a strategy to improve access to needed surgical procedures in the province. The team's report, which recommended the continuation of some existing initiatives and the adoption of some new initiatives, guided the wait list strategy that is outlined in Saskatchewan's Action Plan for Saskatchewan Health Care.

Ultimately the goal of the new action plan is to ensure that patients who are waiting for surgery in Saskatchewan receive the care they need within clinically appropriate timeframes and in a fair and equitable manner.

This goal will be achieved through a comprehensive wait list strategy. The first step in implementing the new strategy was the appointment of the Saskatchewan Surgical Care Network (SSCN), an arms-length advisory body, to oversee improvements to the surgical system. Some other key elements of the new strategy now underway are to:

- improve wait list data and management of wait lists through the creation of the Saskatchewan Surgical Registry to track all patients needing surgery in the province;
- improve fairness among patients by developing and implementing standard criteria for assessment of need;
- provide better information to the public through initiatives, such as the designation by the regional health authorities of key contact people to respond to questions from the public and the development of a patient-centred web site.

There are also elements aimed at improving operational efficiency and enhancing capacity through initiatives such as the provision of surgical wait list funding and the development of human resource strategies.

The wait time indicators for Coronary Artery Bypass Graft surgery and total hip and knee replacement surgery were calculated using information available to Saskatchewan Health from wait list data reported to the Department by the health authorities in Saskatoon and Regina, and data from the main hospital database (the Discharge Abstract Database) compiled by the Canadian Institute for Health Information from information reported to them by all Saskatchewan Hospitals. The decision was made to present these indicators despite the limitations of existing data sources for this purpose, which are described in the specific sections (a and b). Action is already underway to improve wait list data through the development of a Saskatchewan Surgical Registry as part of the provincial Action Plan for Saskatchewan Health Care. The implementation of this Registry will make it possible to provide more complete and accurate information on wait times in the future.

Other access-related information is summarized from the national Health Service Access Survey (HSAS), which was conducted as a special household survey to supplement the

Canadian Community Health Survey (CCHS). The part of the survey summarized here focused on wait times for specialist physician visits, diagnostic services (non-emergency MRIs, CT scans and angiographies), and non-emergency surgery.

Until relatively recently, waiting lists in Canada have been non-standardized, poorly organized, and inadequately monitored. As a result, the systematic collection and reporting of wait time data is relatively new, and jurisdictional differences are likely to exist in the definition of specific indicators of waiting times for surgery. For example, wait times can be calculated from when a person first visits a family doctor, when the patient is assessed by a specialist, when test results confirm the need for further treatment, or from some other point. The lack of standardization ultimately hinders comparisons between provinces/territories, and often within them, as even when attempts are made to select common measurement criteria the required data is often not available.

(a) Wait time for cardiac surgery

Limitations

The measurement and reporting of wait times for CABG surgery, like other types of surgery, have not been standardized in Canada and inter-provincial comparisons of wait time data have not been available. However, some jurisdictions do track and publish wait time information for CABG surgery at the provincial level. For example, Ontario's Cardiac Care Network (CCN) maintains a provincial patient registry and management information system for cardiac care, and posts wait time information routinely on its web site (www.ccn.on.ca). The Ontario CCN web site shows median waits for its different urgency categories (emergency + urgent, semi-urgent, elective) and includes the percentage of surgery in each category that was performed within the Recommended Maximum Waiting Time (RMWT) for the patient, which is estimated based on the seriousness of their medical condition.

It is recognized that reporting on a nationally agreed upon indicator would be a significant step towards gathering accurate and comparable information on wait times for surgery. To this end, Saskatchewan has calculated this indicator for the first time, and although limitations exist, work that is underway to improve wait list data will strengthen our capability to report on the indicator in the future.

The following limitations with respect to the indicator presentation requirements apply:

Notes on Presentation Limitations

Months to clear wait list was not calculated because the limitations to the waitlist data currently available to Saskatchewan Health do not allow a reasonable level of confidence in results for this particular indicator.

The key limitations affecting the ability to meet PIRC specifications include the following:

- Waitlist data excludes emergent cases. Emergent cases compose about 45% of CABG cases.
- Waitlist data coding is not specific enough to allow the Department to reliably identify "isolated" cases "uncomplicated by any other procedure." Since this specific indicator is based on cases where surgery has not yet been performed and no post-operative record exists there is no way to use another database (e.g. the Canadian Institute for Health Information's Discharge Abstract Database) to identify the specified uncomplicated cases.
- Waitlist data does not include the date of the cardiac catheterization.
- Waitlist data has not been routinely verified to ensure that cases waiting for surgery should remain on the waitlist. Past checks have revealed a significant number of cases that should have been removed from the lists.
- Waitlist data does not allow the Department to identify cases where a decision was made to delay surgery (this is not a required field in the database).

Median wait for surgery and **Distribution of wait times** were calculated using information from the Canadian Institute for Health Information (CIHI) Discharge Abstract Database (DAD) only - the provincial waitlist database was not used. The DAD was used to identify both the "uncomplicated" CABG surgery performed during the year and the most recent prior cardiac catheterization.

The PIRC specifications were addressed as follows:

- Only surgery for adults aged 20 and over is included, as specified.
- Only surgery for Saskatchewan residents is included, as specified.
- Data is from 2000-2001 rather than 2001-2002. The fiscal year 2000-2001 was the latest complete year of data available from the Discharge Abstract Database (DAD) at the time of calculation.
- Both emergent and non-emergent surgery are included.
- Waits for surgery were calculated from the most recent recorded cardiac catheterization prior to, or on the day of, the CABG procedure to the date of the CABG procedure, as specified. It is possible that in some cases the cardiac catheterization identified may not be the catheterization that was used to determine the need for bypass surgery.
- Only "isolated" CABG cases "uncomplicated by any other procedure" are included, as specified. The indicator criteria do not specify which procedures should be considered as complicating or not complicating a case, except for the example of valve repair or replacement. Judgment was used to determine which procedures should be considered as complicating procedures and the exclusions made by Saskatchewan Health may differ from those selected in other jurisdictions. The included cases compose about 69% of all CABG procedures performed during the year.
- CABG procedures for which no prior cardiac catheterization procedure could be identified are excluded.
- No cases where surgery was performed were excluded because a past decision was made by the individual or his/her physician to delay surgery for medical or other reasons. Districts/regions are not currently required to report delays or re-scheduling of surgery.

The wait time calculations are based on 504 CABGs (about 69% of all CABGs performed during the year). Most of the exclusions were because of complicating procedures).

Coronary Artery Bypass Graft (CABG) Surgery

Coronary artery bypass surgery is reserved for severe cases of coronary blockage that cannot be addressed by any other treatment. This procedure, which involves grafting a portion of a small blood vessel from the leg or chest to use as the new "bypass artery" allows the blood to flow to the heart muscle avoiding the blocked artery, thereby reducing angina and risk of heart attack. It is typically a high-risk surgery with extended recovery, and is a costly procedure. Therefore, individuals who require this surgery have usually been in the health system for some time and have an elevated requirement for surgery. CABG may be the optimal therapy for such patients, as long as they are well enough to tolerate major cardiac surgery and their life expectancy is more than 6 months [243].

Wait times for this type of surgery is particularly pertinent in terms of alleviating the burden that coronary artery disease places on the individual and the family, and in a broader context, the country in terms of the economic and social costs incurred from absenteeism from the labour force, ongoing medical expenses, and ultimately potential years of life lost. The burdens of waiting for care vary, depending on procedure, age, gender and employment status.[271]

CABG rates have been increasing in Canada since the 1980s, with a significant increase reported in the number of procedures being performed among elderly people [244] . There has also been a trend towards a higher incidence of re-operations, and an increase in the number of patients who present with unstable coronary syndromes [245]. Data from the Canadian Institute for Health Information indicates that Coronary Artery Bypass Graft surgery was performed in Saskatchewan at an age-adjusted rate of 92.9 surgeries per 100,000 population in 1999-2000, compared to 81.9 surgeries per 100,000 in 1997-98 [246]. The crude rate for Saskatchewan for 1991 was 47 per 100,000, similar to the Canadian rate for that year of 50 per 100,000 [247].

Saskatchewan's age-adjusted rate of 92.9 CABG surgeries per 100,000 population in 1999-2000 is similar to the Canadian rate of 94.2 surgeries per 100,000 population[248]. The Saskatchewan rate is 6th among the provinces and 2nd among the four western provinces. Variations in CABG surgery rates can be attributed to numerous factors, including differences in population demographics, physician practice patterns, and availability of services. As such the demand for cardiac surgery can be observed to vary along not only temporal but also geographical lines.

Variations in demand and surgery rates may also have an impact on wait lists and times. Whether waiting lists are an indicator of the need for a particular service, or more a reflection of the demand for a service, (which in itself is a complex interplay between the clinical needs of patients, the perceived availability of resources, and the clinical views on efficacy and patient management styles of practitioners) remains to be answered.

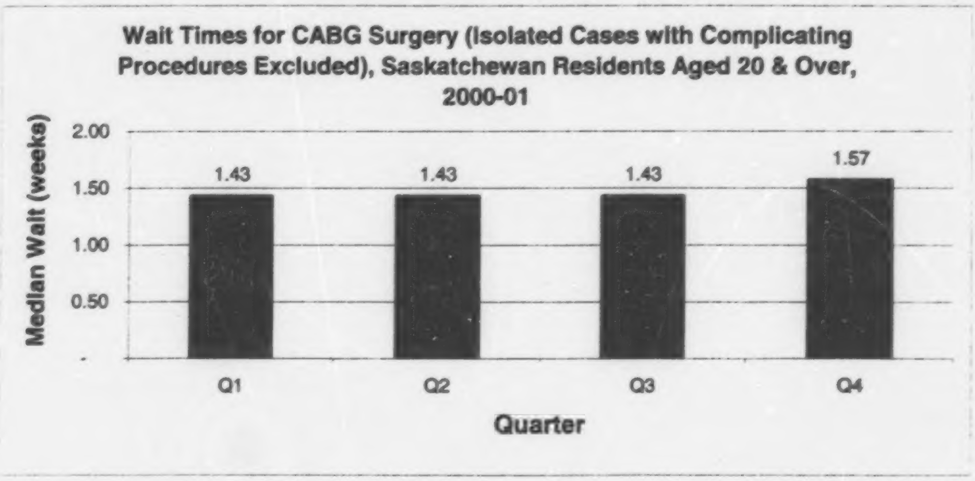
(ii) Median Wait for Surgery

The following data were available for presentation after consideration of the aforementioned limitations.

Cardiac procedures have received a high priority in Saskatchewan and wait times for them appear to be relatively short. It is difficult, however, to provide significant insight on whether these waits are appropriate without comparing them to similarly collected and reported data from other jurisdictions and/or agreed-upon standards.

The median wait time for the 504 procedures carried out in the province in 2000-01 that met the PIRC indicator criteria was 1.43 weeks. The median was the same for the first three quarters and slightly higher in the last quarter. The number of procedures performed varied little from quarter to quarter, ranging from a low of 23.6% in the fourth quarter to a high of 26.0% in the third quarter. Wait times for the indicator are calculated from the date of the last recorded cardiac catheterization, on or before the surgery date. Due to jurisdictional differences in the time that defines the start of a wait time, no comparable information was available at time of printing.

Figure 144 Wait Times: CABG Surgery in Saskatchewan by Quarter

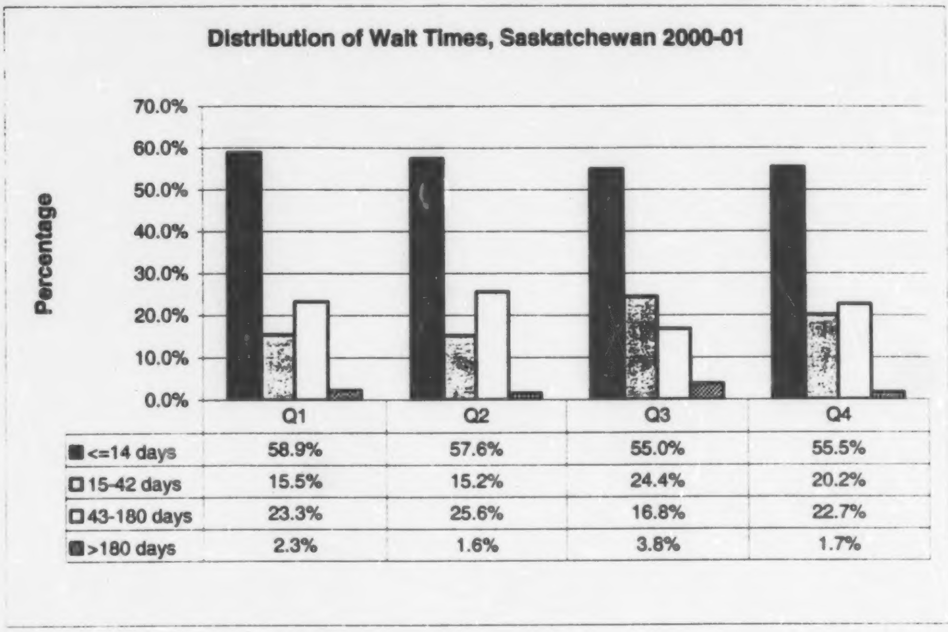


Source: Saskatchewan Health, Acute and Emergency Services, Specialized Services Unit

(iii) Distribution of wait time

The largest percentage of cases waiting for CABG surgery were dealt with in less than or equal to 14 days (between 55% and 59% of cases). This was true regardless of quarter. Differences between quarters were observed with respect to the percentage of surgeries performed in 15-42 days. For the first two and the last quarter of the year fewer cases were dealt with in 15-42 days when compared to the percentage of cases waiting somewhere between 43-180 days. Only in quarter 3 were more people waiting for 15-42 days. Small percentages were recorded for cases where individuals waited more than 180 days (1.6% to 3.8%).

Figure 145 Distribution of Wait Times: CABG Surgery, Saskatchewan 2000-01



	Q1	Q2	Q3	Q4
■ <=14 days	58.9%	57.6%	55.0%	55.5%
□ 15-42 days	15.5%	15.2%	24.4%	20.2%
□ 43-180 days	23.3%	25.6%	16.8%	22.7%
■ >180 days	2.3%	1.6%	3.8%	1.7%

Source: Saskatchewan Health, Acute and Emergency Services, Specialized Services Unit

(b) Wait time for hip and knee replacement

Limitations

Wait times for total hip and total knee replacement surgery, like other types of surgery, have not been standardized in Canada and inter-provincial comparisons of wait time data have not been available. We recognize that reporting on a nationally agreed upon indicator would be a significant step towards gathering accurate and comparable information on wait times for surgery. To this end, Saskatchewan has calculated this indicator for the first time and although limitations exist, work that is underway to improve wait list data will strengthen our capability to report on the indicator in the future.

Notes on Presentation Limitations

Months to clear the wait list was not calculated because the limitations to the waitlist data currently available to Saskatchewan Health do not allow a reasonable level of confidence in results for this particular indicator.

The key limitations affecting the ability to meet PIRC specifications include the following:

- Waitlist coding is not specific enough to allow the Department to identify "new total hip or knee replacements" in both Saskatoon and Regina. Since this specific indicator is based on cases where surgery has not yet been performed and no post-operative record exists, there is no way to use other data (e.g. data from the Canadian Institute for Health Information's Discharge Abstract Database) to identify the cases that were total hip and knee replacements.
- Waitlist data has not been routinely verified to ensure that cases waiting for surgery should remain on the waitlist. Past checks have revealed a significant number of cases that should have been removed from the lists.
- Waitlist data excludes emergent cases.
- Waitlist data excludes surgery performed outside of Saskatoon and Regina.
- Waitlist data does not allow the Department to identify cases where a decision was made to delay surgery (this is not a required field in the database).

Median wait and **Distribution of waits** indicators were calculated using information from both the CIHI Discharge Abstract Database (DAD) and the provincial waitlist database. The Discharge Abstract Database (DAD) was used to identify total hip and total knee replacements that were performed. The total hip and total knee replacements were then identified on the waitlist database by matching Health Services Numbers and surgery dates, so that the waitlist database could be used to calculate the waits for surgery.

The PIRC specifications were addressed as follows:

- Only surgery for adults aged 18 and over is included, as specified.
- Only surgery for Saskatchewan residents is included, as specified.
- Data is from 2000-2001 rather than 2001-2002. The fiscal year 2000-2001 was the latest complete year of data available from the Discharge Abstract Database (DAD) at the time of calculation.
- Only surgery performed in Regina and Saskatoon is included because the smaller hospital centres in the province do not report wait list data. About 83% of total knee replacements and 85% of total hip replacements are performed in Regina and Saskatoon.
- Only non-emergent surgery is included because emergent cases are not included in reported waitlist data. About 83% of total hip replacements and 96% of total knee replacements performed in the reporting hospital centres are non-emergent.
- Waits for surgery were calculated from the booking date (i.e. the date that the case was put on the waitlist) to the date of surgery. There may be some delay between the date the patient and surgeon agree that surgery is needed and the booking date.
- No surgery performed was excluded because of a prior delay due to a decision made by the individual or his/her physician for medical or other reasons. Districts/regions are not currently required to report delays or re-scheduling of surgery. The data includes people

who may have refused a surgery date, as well as people who were unavailable for periods of time during their wait.

- Booking dates on wait list records can change when the priority of a case is changed (e.g. from elective to urgent). The earliest occurrence of HSN and booking identifier was used to determine the booking date (i.e. start of wait).

Hip & Knee Replacement Surgery

Major joint replacement surgery is a procedure to remove and replace the hip and knee joint. This increasingly common surgical technique is performed to improve the functional status and quality of life of the individual for whom non-surgical therapies are no longer an option.

The most recent comparable information from the Canadian Institute for Health Information indicates that total hip replacement procedures have been performed in Saskatchewan at age-adjusted rates higher than the national rate. This was true in all years from 1995-96 through 1999-00. In 1999-00 (the most recent year for which data is available) Saskatchewan was one of four provinces with hip replacement rates considerably above the national rate. Saskatchewan's age-adjusted rates for total knee replacements were marginally higher than the national rate for the years from 1995-96 to 1999-00. In 1999-00 Saskatchewan was one of six provinces with knee replacement rates similar to the national average.

See Section 5.1 on "Age Related Services" for more information on these procedures and rates.

Despite performing total knee and total hip replacement procedures at rates similar to or higher than the national rate and the rates in many other provinces, waits for these procedures appear to be relatively long in Saskatchewan and have been a focus of concern in recent years. The reasons for these apparently long waits are not clear. However, the fact that the age-adjusted rates are not out of line with other jurisdictions suggests that factors other than age may be driving the need and/or demand for these types of surgery in Saskatchewan, or that other factors, such as the way that wait lists are managed is resulting in extended waits for some patients.

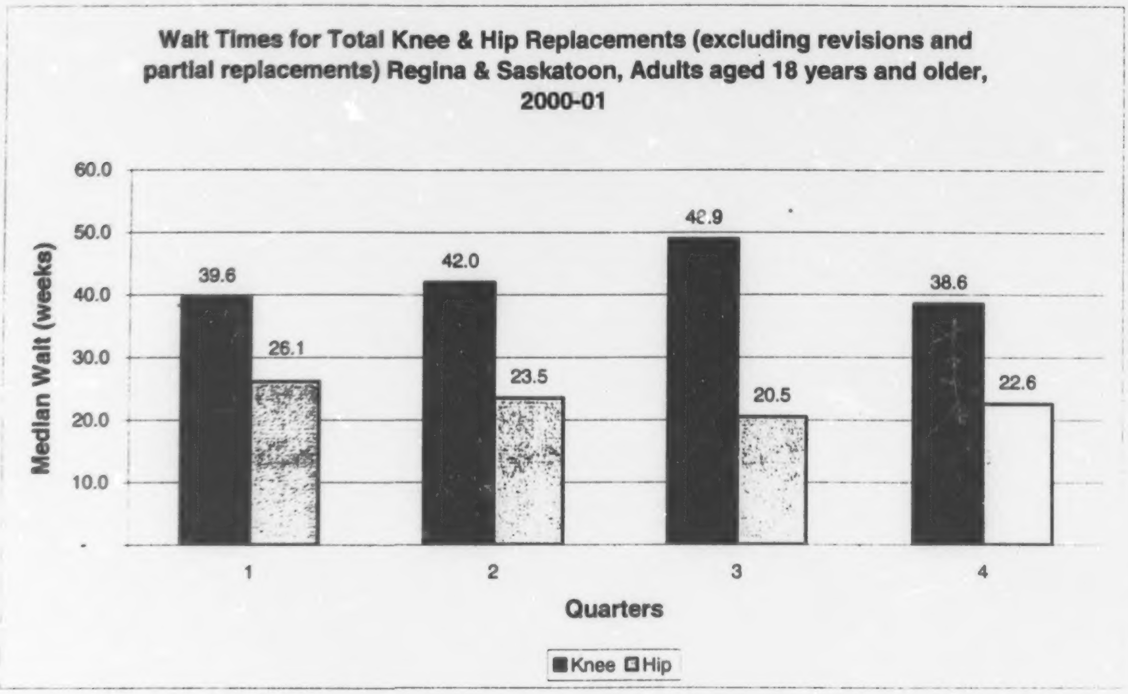
(ii) Median wait

The median wait times represent only non-emergent surgery for total hip or knee replacement and are calculated using the wait list booking date as the start point for the wait. This date may differ from when the patient and the physician agree that surgery is needed.

No suitable comparative data on waits for total hip and total knee replacement surgery was available at time of publication. Within Saskatchewan, however, waits for total hip and knee replacements are known to be relatively long, and it is a significant concern that some patients are waiting too long for these procedures.

The wait times for knee replacement surgery exceed those for hip replacement wait times. The median wait time for total knee replacements performed in 2000-01 was 41.6 weeks, compared to 23.1 weeks for total hip replacements. The longest quarterly wait time for total knee replacement was 48.9 weeks (Quarter 3), and for total hip replacement 26.1 weeks (Quarter 1), while the shortest quarterly wait times were 38.6 for total knee replacements and 20.5 weeks for total hip replacements.

Figure 146 Wait Times: Hip & Knee Replacements in Saskatchewan by Quarter



Source: Saskatchewan Health, Acute and Emergency Services, Specialized Services Unit

(iii) Distribution of wait times

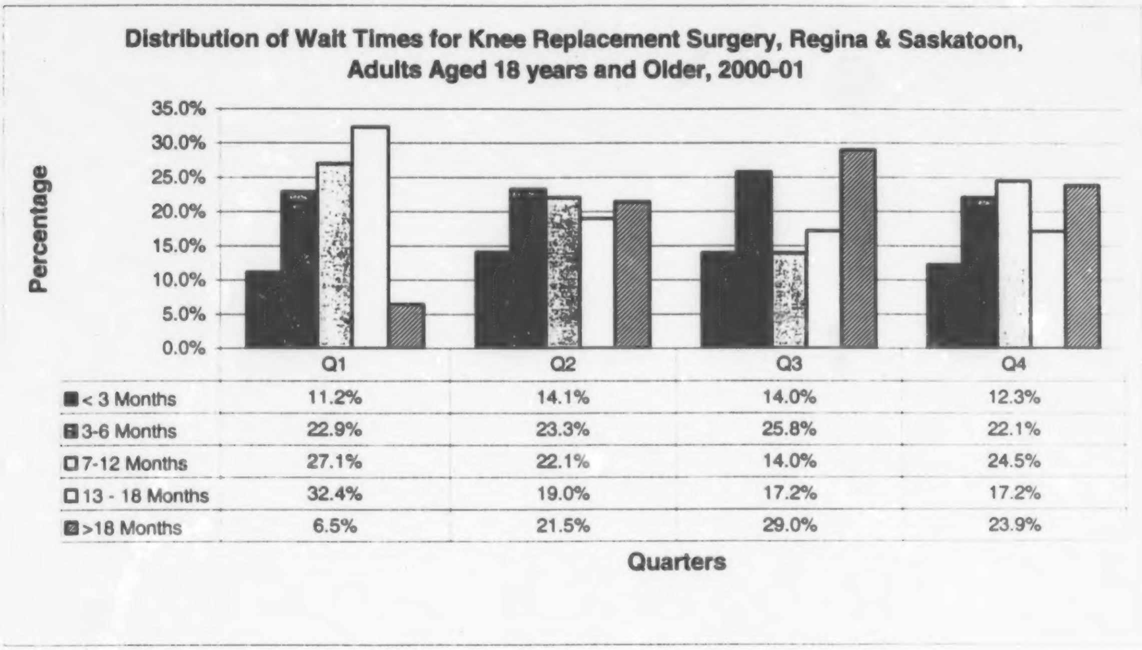
In order to preserve clarity of interpretation the distribution of wait time data is presented separately for knee and hip replacement.

Overall, 36.5% of people receiving total knee replacements in 2000-01 waited less than 6 months, 21.7% waited 7-12 months, 21.4% waited 13--18 months and 20.4% waited over a year. Figure 147 shows considerable quarterly variation in the distribution of wait times for total knee replacements, though it is not clear what the cause of these variations is.

In fact, the waits shown here for total knee replacement surgery are longer than waits identified in a recent analysis of "arthroplasty of the knee", which showed a median wait of 26.7 weeks for surgery performed in the 2001 calendar year (as compared to the median of

41.6 weeks reported previously). A comparison of the distribution of waits in the two analyses, shows a lower percentage of total knee replacement cases performed in under 6 months (compare 36.5% to 50%) and higher percentage that waited 13-18 months (compare 21.4% to 12%). One of the reasons for these differences is that the indicator featured in this document focuses only on total knee replacements (682 cases), while the former analysis includes revisions and some other non-arthroscopic knee repair procedures (847 cases). Waits for total knee replacement procedures do in fact appear to be longer than waits for revisions and other major knee procedures. It is important to note, though, that some other factors also contribute to the differences in wait times. One of these factors is that the total knee replacement indicator covers a different time period (April 1, 2000 to March 31, 2001) than the broader analysis of arthroplasty procedures (calendar year 2001).

Figure 147 Distribution of Wait Times: Knee Replacement, Saskatchewan 2000-01



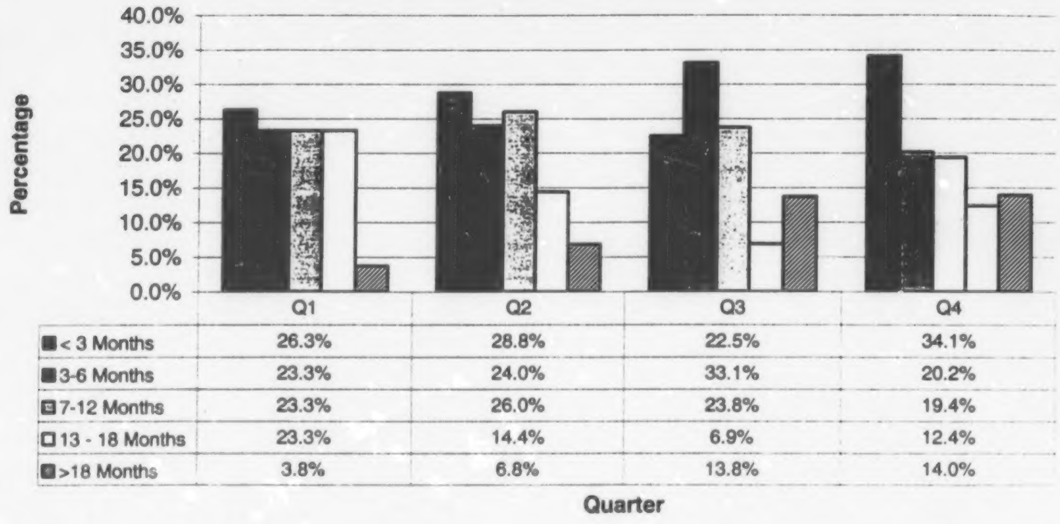
	Q1	Q2	Q3	Q4
■ < 3 Months	11.2%	14.1%	14.0%	12.3%
▩ 3-6 Months	22.9%	23.3%	25.8%	22.1%
☐ 7-12 Months	27.1%	22.1%	14.0%	24.5%
☐ 13 - 18 Months	32.4%	19.0%	17.2%	17.2%
▨ >18 Months	6.5%	21.5%	29.0%	23.9%

Source: Saskatchewan Health, Acute and Emergency Services, Specialized Services Unit

Wait times for hip replacement surgery are distributed somewhat differently from those of knee replacement surgery. Overall, 53% of people who received total hip replacements during the year had their surgery within 6 months of being placed on a wait list, 23.2% waited 7-12 months, 13.9% waited 13-18 months and 9.7% waited more than 18 months. Again, there is some variation from quarter to quarter (see Figure 148), though it is difficult to interpret these changes over such a short time frame.

It would appear that more people waited longer to receive knee replacement surgery than they did to receive hip replacement surgery. If we assume wait times are an indication of perceived severity and need for surgery, it would appear that knee problems may be regarded as being less burdensome on the individual than are hip problems that require surgical replacement. There may also be differences in wait times between individual surgeons and in different locations for the same procedure.

Figure 148 Distribution of Wait Times: Hip Replacement, Saskatchewan 2000-01


Distribution of Wait Times for Hip Replacement Surgery, Regina & Saskatoon, Adult Aged 18 years and Older, 2000-01

	Q1	Q2	Q3	Q4
■ < 3 Months	26.3%	28.8%	22.5%	34.1%
■ 3-6 Months	23.3%	24.0%	33.1%	20.2%
▨ 7-12 Months	23.3%	26.0%	23.8%	19.4%
☐ 13 - 18 Months	23.3%	14.4%	6.9%	12.4%
▨ >18 Months	3.8%	6.8%	13.8%	14.0%

Source: Saskatchewan Health, Acute and Emergency Services, Specialized Services Unit

(c) Wait time & distribution of specialist services, diagnostic tests, and surgery

(i) Median wait times

The Health Service Access Survey (HSAS) was conducted as a special household survey to supplement the Canadian Community Health Survey (CCHS). The following data pertains to the first part of the HSAS: waiting times for selected medical procedures. The primary aim of this part of the survey was to gather waiting time information on three areas: specialist physician visits, which include visits for a new illness or condition only; diagnostic services, i.e., non-emergency MRIs, CT scans and angiographies only; and surgery, which includes only non-emergency cases.

Wait time, in this context, refers to the length of time, in weeks, between the patient being referred for a specialised service and receiving that service, during the 12 months prior to the survey.

The ability to obtain routine care in a timely way is important in maintaining health, preventing health emergencies and preventing the inappropriate use of services (e.g., use of hospital emergency rooms for non-emergencies). Many important health and economic benefits result from the appropriate use and access to routine care (lost work time, decreased productivity associated with physical impairment and anxiety, and physical and psychological pain and suffering).

Limitations

Waiting times remain an issue that is troubled by inherent measurement issues, but is still one most pursued by the general public and policy makers, and equitable access to care remains at the heart of efforts in the continued surveillance of wait lists and wait times.

Limitations of the HSAS

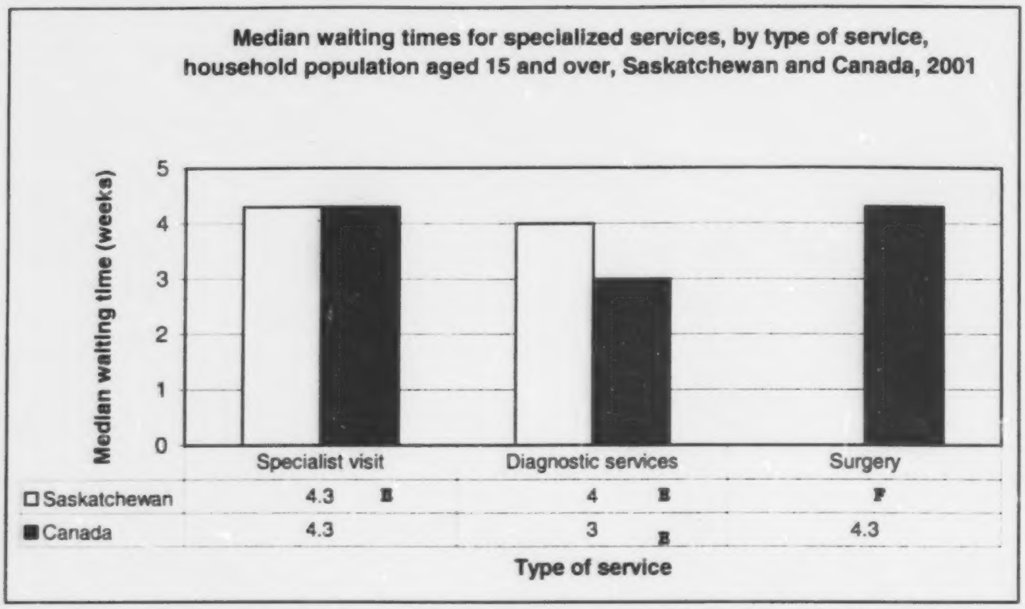
The HSAS information also has many limitations in addition to issues of reliability and validity. Indeed, the HSAS sample size was too small to provide estimates in some of the areas, and sampling variability too great for valid estimates to be presented, or at best interpreted with substantial caution. Due to issues of recall, the use of self-report measures such as the HSAS should be used cautiously. It is not clear if many patients know when they are put on wait lists or if they could recall it precisely if they did. Furthermore, without acceptable benchmarks, the interpretation of what constitutes an acceptable wait time is extremely subjective.

Trend

In both Saskatchewan and Canada, the median waiting times for specialized services[viii] for specialist visits for household population aged 15 and over in 2001 was 4.3 weeks. Saskatchewan residents and Canadians 15 years and older reported the median waiting times for diagnostic services at 4, and 3 weeks, respectively.

[viii] "Specialized services" includes specialist visits for a new illness or condition; non-emergency surgery other than dental surgery; and selected diagnostic tests (non-emergency MRIs, CT scans, and angiographies).

Figure 149 Median Wait Times for Specialized Services: Saskatchewan & Canada, 2001



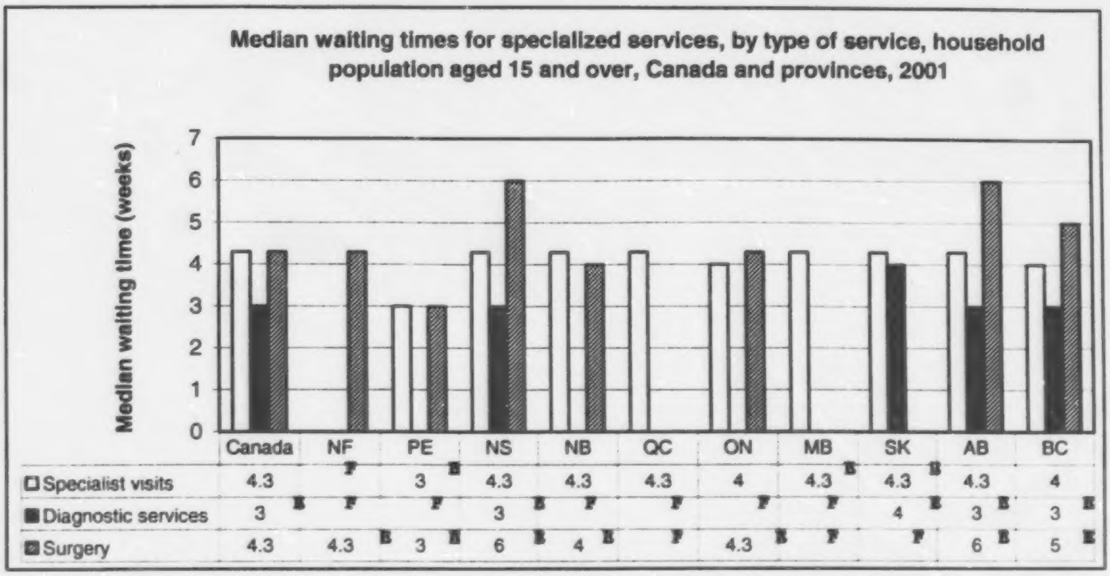
Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.

Provincial comparisons

Generally, the median waiting time for specialized services for specialist visits for the provinces was 4.3 weeks except for Prince Edward Island (3 weeks), Ontario (4 weeks) and British Columbia (4 weeks). Newfoundland's information was unpublished due to extreme sampling variability or small sample size.

Figure 150 Median Wait Times for Specialized Services: Provincial Comparison, 2001



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ Specialist visits	4.3	F	3 E	4.3	4.3	4.3	4	4.3 E	4.3 E	4.3	4
■ Diagnostic services	3 E	F	F	3 E	F	F	F	F	4 E	3 E	3 E
▨ Surgery	4.3	4.3 E	3 E	6 E	4 E	F	4.3 E	F	F	6 E	5 E

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.

Wait Times for Specialized Services

Waiting for a specialist visit, a diagnostic procedure or a non-emergency surgery can have serious implications for the individual. The anxiety caused by waiting for such a procedure can take its toll on the patient and the family. Since many conditions can be successfully treated if caught in the early stages of disease progression, reductions in mortality and morbidity can also follow from reduced wait times for specialist services.

Median wait times for specialist services, diagnostic services and non-emergency surgery tend to be relatively comparable across the country according to the HSAS. Caution in using this information is urged due to lack of confidence in the data.

The median wait time in Saskatchewan for specialist visits is similar to other provinces, for which data is available, and the national average. Similarly, for surgical procedures, estimates for the province are not different from other provincial data.

(ii) Distribution of wait times

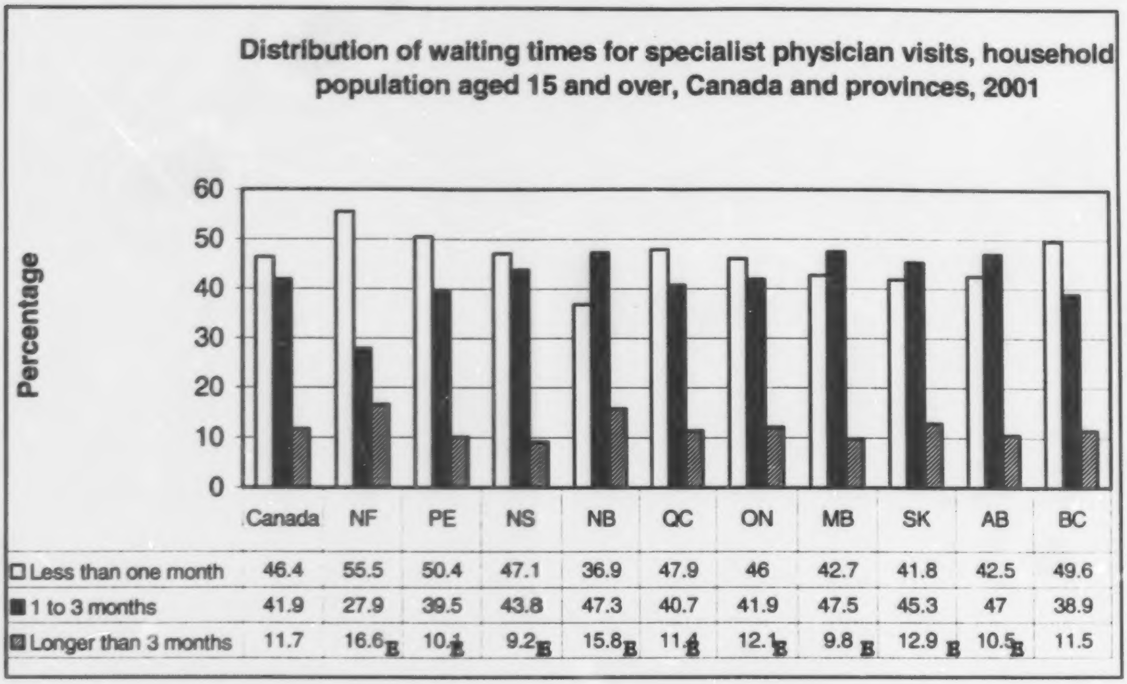
(a) Specialist physician visits

Among Saskatchewan residents 15 years and older who reported waiting for specialist physician visits, 41.8 per cent waited less than one month, 45.3 per cent waited one to three months and 12.9 per cent waited longer than three months. Saskatchewan had the second lowest (41.8 per cent) percentage of those who reported waiting less than one month for specialist physician.

Over 40 per cent of Canadians who waited for specialist physician visits waited one to three months. Saskatchewan had the fourth highest (45.3 per cent) percentage of those who reported waiting one to three months for specialist physician visits.

Of all Saskatchewan residents aged 15 and over who reported waiting for specialist physician visits, 12.9 per cent waited longer than three months. Of all the provinces, Saskatchewan had the third highest (12.9 per cent) percentage of those who reported waiting longer than three months for specialist physician visits.

Figure 151 Distribution of Wait Times for Physician Visits: Provincial Comparison, 2001



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
□ Less than one month	46.4	55.5	50.4	47.1	36.9	47.9	46	42.7	41.8	42.5	49.6
■ 1 to 3 months	41.9	27.9	39.5	43.8	47.3	40.7	41.9	47.5	45.3	47	38.9
▨ Longer than 3 months	11.7	16.6 B	10.1 B	9.2 B	15.8 B	11.4 B	12.1 B	9.8 B	12.9 B	10.5 B	11.5

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

Note: May not add to 100% due to rounding.

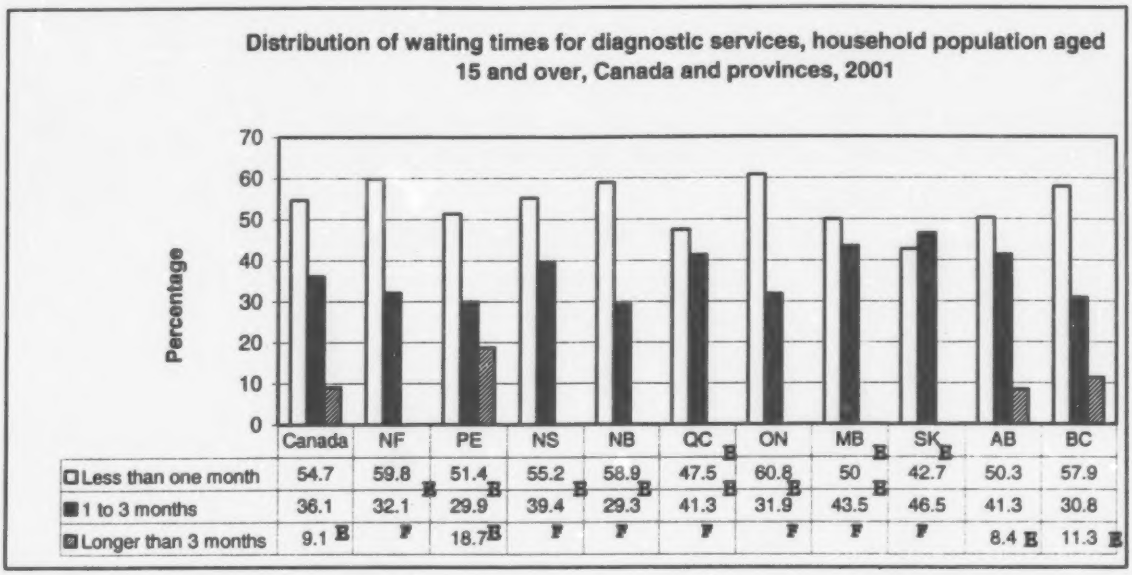
B Interpret with caution (high sampling variability).

(b) Diagnostic services

Nearly 55 per cent of Canadians who waited for diagnostic services waited less than one month. Of all the provinces, Saskatchewan had the lowest (42.7 per cent) percentage of those who waited less than one month for diagnostic services. Ontario had the highest (60.8 per cent) percentage of those aged 15 and over who reported waiting less than one month for diagnostic services.

Approximately 36 per cent of Canadians waiting for diagnostic services waited one to three months. Saskatchewan had the highest (46.5 per cent) percentage of those who waited one to three months for diagnostic services.

Figure 152 Distribution of Wait Times for Diagnostic Services: Provincial Comparison, 2001


Distribution of waiting times for diagnostic services, household population aged 15 and over, Canada and provinces, 2001

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ Less than one month	54.7	59.8	51.4	55.2	58.9	47.5 E	60.8	50 E	42.7 E	50.3	57.9
■ 1 to 3 months	36.1	32.1 E	29.9 E	39.4 E	29.3 E	41.3 E	31.9 E	43.5 E	46.5	41.3	30.8
▨ Longer than 3 months	9.1 E	F	18.7 E	F	F	F	F	F	F	8.4 E	11.3 E

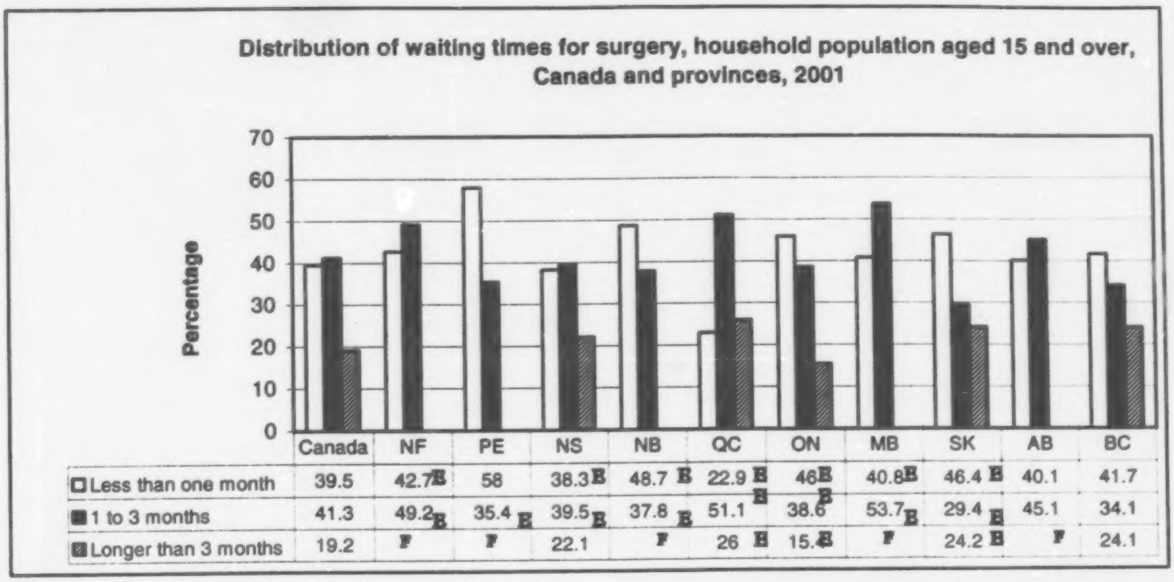
Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

Note: May not add to 100% due to rounding.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sampling size.

(c) Surgery

Figure 153 Distribution of Wait Times for Surgery: Provincial Comparison, 2001



Distribution of waiting times for surgery, household population aged 15 and over, Canada and provinces, 2001

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ Less than one month	39.5	42.7 E	58	38.3 E	48.7 E	22.9 E	46 E	40.8 E	46.4 E	40.1	41.7
■ 1 to 3 months	41.3	49.2 E	35.4 E	39.5 E	37.8 E	51.1 E	38.6 E	53.7 E	29.4 E	45.1	34.1
▨ Longer than 3 months	19.2	F	F	22.1	F	26 E	15.4 E	F	24.2 E	F	24.1

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

Note: May not add to 100% due to rounding.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.

Approximately 40 per cent of those waiting for surgery across Canada waited less than one month. Saskatchewan had the third highest (46.4 per cent) percentage of those who waited less than one month for surgery.

Saskatchewan had the lowest (29.4 per cent) percentage of those who waited one to three months for surgery. However, these data should be interpreted with caution due to the high sampling variability.

Distribution of wait times indicates that for most provinces, the majority of patients are seen in less than or equal to three months. This is especially the case for specialist visits and diagnostic procedure wait times. Although small differences between the provinces exist, it is not possible to conclude what the source of these variations are, especially considering the caution in interpretation warranted from the high degree of sampling variability in the data.

The Burden of Waiting for Care

Burdens of waiting for care vary, depending on procedure, age, gender, and employment status [282]. Although patients tend to feel that wait times are too long, very few people indicate that more money should be spent on reducing wait times. Evidence from the UK also does not support the use of private sector options in an attempt to reduce wait time. Greater access to private care appears to be generally associated with longer public sector queues - particularly where physicians operate in both sectors, as in the United Kingdom [282].

Many factors contribute to growing waiting lists and times, including system coordination, physician and patient behaviour, technological change in intervention options, reductions in resources, and changing disease patterns [282]. The HSAS information however is based on individuals' recollection about waiting times as well as perceptions about the appropriateness of the waits. These data will be difficult to use in an objective way to develop strategies to improve or rationalize waiting lists.

The considerable economic and social burden that delayed access to services such as specialist visits, diagnostic techniques and non-emergency surgeries can cause in terms of increasing morbidity and mortality costs, suggests that provision should be made to increase the validity of measurement of wait times as an indicator of health system performance.

(d) Access to 24/7 first contact health services

(i) Difficulty obtaining routine or on-going health services

Limitations

Accessibility is a core principle of Canadian health policy, however, despite this provision, there is little stipulation as to what is meant by reasonable access [249]. The perceived need for a service as defined by the population may be different from what providers and policy-makers consider as medically necessary services [250]. As such public perceptions of need (that are not addressed by the HSAS) may impact upon perceptions of adequate access to health services. Individual differences in the understanding about what constitutes routine health care will affect the perceptions of asked about their access to routine health care.

The HSAS suffers from the assumption that individuals' perceptions about health services are based on the nature and availability of the services. In fact such perceptions are based on many things including the demeanour of the individual.

The HSAS does not ask why participants felt that they had not received adequate care; therefore, it is left open to interpretation whether this is due to lack of availability of health services, or personal inability to access them. In addition, high confidence intervals around the means suggest a lack of certainty in the estimates provided in several places in the data. In some places sample size was so small and sampling variability so extreme as to exclude the presentation of data.

Ratings of good access to health care (expressed in experiences of barriers to receiving that care), therefore, although reflective of patient satisfaction, an important variable in its own right, may actually tell us little about expected health outcomes. A direct correlation between improved access to health care services and improved health status remains difficult to obtain [251].

Despite these observations, the following commentary on access to routine health care services provides some context to the presentation above.

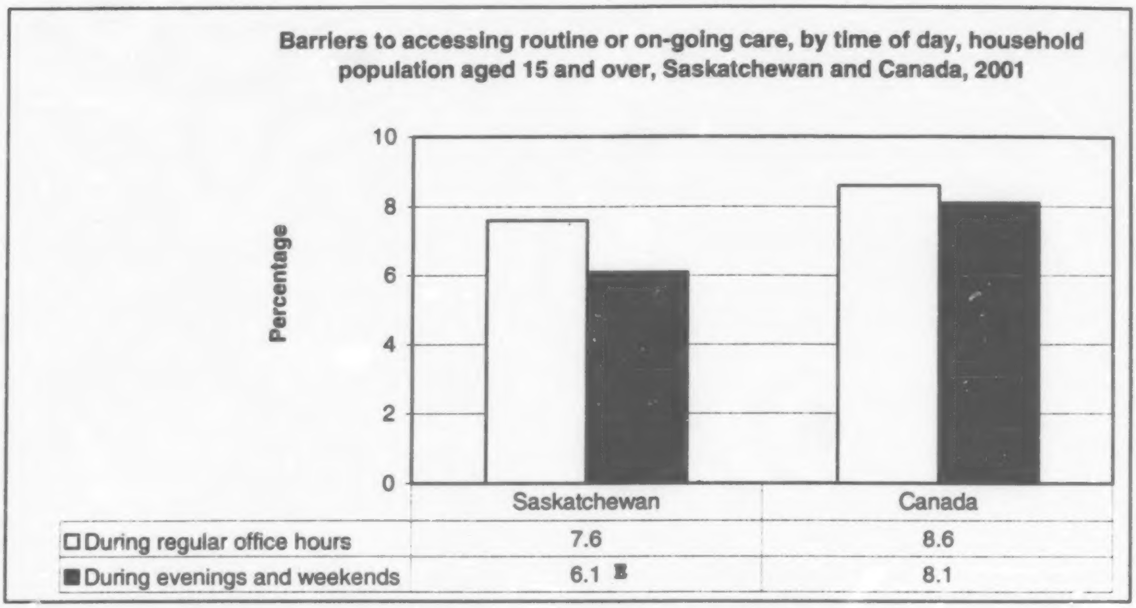
The Health Service Access Survey (HSAS) was conducted as a special household survey to supplement the Canadian Community Health Survey (CCHS). The following data pertains to the second part of the HSAS; access for self or family member to routine care at various times of the day. This information has the potential to provide some assessment of the problems experienced by individuals in obtaining care as well as patterns of use.

Among the residents of Saskatchewan and Canada 15 years and older, barriers to accessing routine or on-going care during regular office hours[ix] were higher than during evenings and weekends[x] in 2001. Nearly one-tenth (8.6 per cent) of Canadians and 7.6 per cent of Saskatchewan residents aged 15 and over reported having barriers to accessing routine or on-going care during regular office hours compared with 6.1 per cent and 8.1 per cent during evenings and weekends, respectively.

[ix] Regular office hours are 9 AM to 5 PM, Monday to Friday.

[x] Evenings are 5 PM to 9 PM, Monday to Friday and weekends are Saturday and Sunday from 9 AM to 9 PM.

Figure 154 Access 24/7 Routine Care: Saskatchewan & Canada, 2001



	Saskatchewan	Canada
☐ During regular office hours	7.6	8.6
■ During evenings and weekends	6.1 E	8.1

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

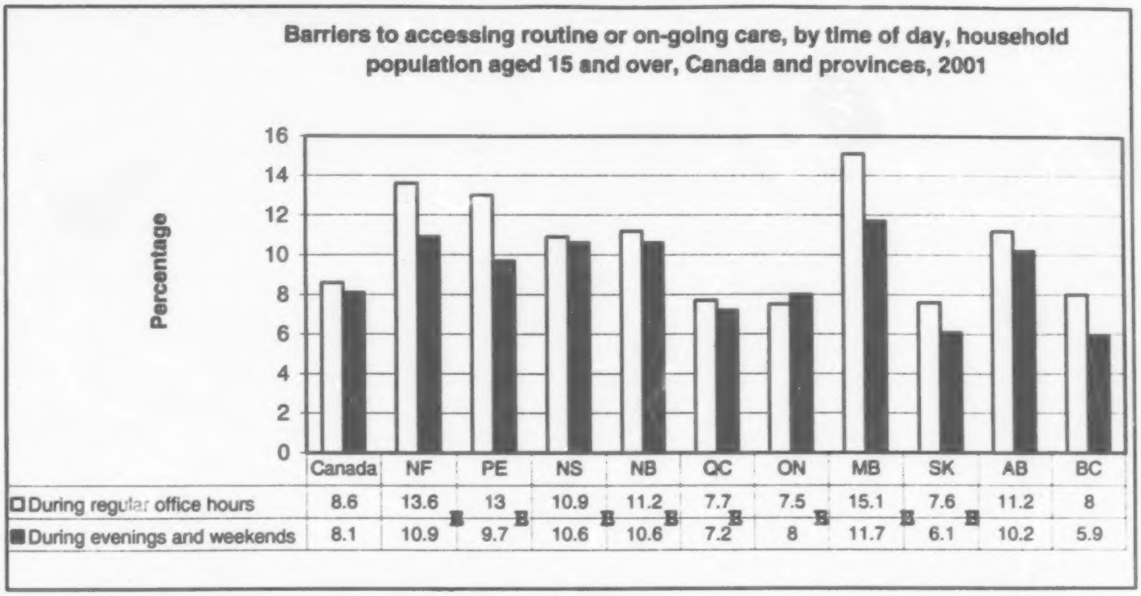
E Interpret with caution (high sampling variability).

Provincial comparisons

Saskatchewan had the second lowest (7.6 per cent) percentage of residents aged 15 and over who experienced barriers to accessing routine or on-going care during regular office hours.

Similarly, Saskatchewan had the second lowest (6.1 per cent) percentage of residents aged 15 and over who experienced barriers to accessing routine or on-going care during evenings and weekends.

Figure 155 Access 24/7 Routine Care: Provincial Comparison, 2001



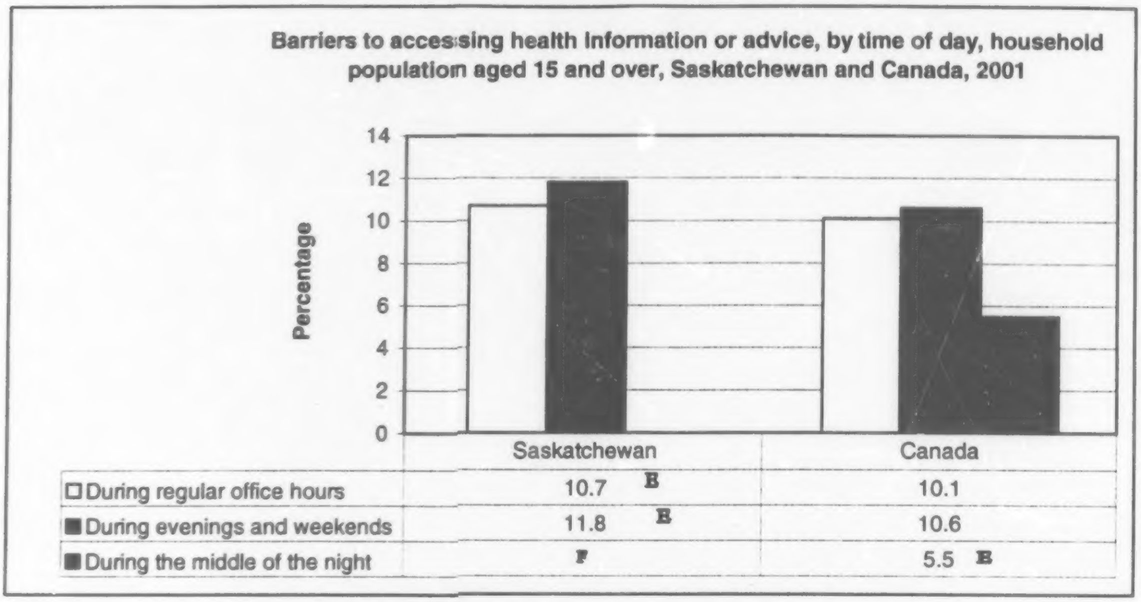
B Interpret with caution (high sampling variability).

Access to Health Information

Access to health information is an important area of health service delivery although it is often considered secondary to most other health services. Health information services have been emphasised as an increasingly important access issue in other countries. The British National Health System (NHS) recently introduced a web-based health information and telephone consulting service [252] that was immediately accessed by over 1.5 million people in the UK in its first day of operation. This improved access to health service information has not been the focus of health access initiatives in Canada. The Canadian Health Network, a national public health information access initiative provides general information via the Internet on health topics, but is not an alternative to professional advice, and furthermore is only accessible by individuals with access to the appropriate technology and skills to operate it. Issues, therefore, remain in terms of the access to health information for certain sectors of the population.

The percentages of Saskatchewan residents experiencing barriers to accessing health information or advice by time of day were about the same as the national averages. In 2001, 11 per cent and 12 per cent of Saskatchewan residents aged 15 and over had barriers to accessing health information or advice during regular office hours and during evenings and weekends compared with 10 per cent and 11 per cent of the national averages, respectively. However, Saskatchewan's percentages should be interpreted with caution.

Figure 156 Access 24/7 Health Information: Saskatchewan & Canada, 2001



	Saskatchewan	Canada
□ During regular office hours	10.7 E	10.1
■ During evenings and weekends	11.8 E	10.6
■ During the middle of the night	F	5.5 E

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

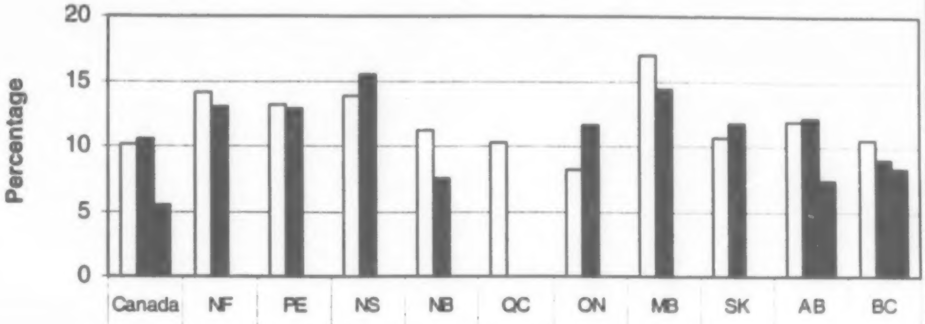
E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.

Provincial comparisons

In Saskatchewan, 10.7 per cent of residents aged 15 and over had barriers to accessing health information or advice during regular office hours. This was similar to British Columbia (10.6 per cent), Quebec (10.3 per cent) and slightly more than Ontario (8.2 per cent). Similarly, 11.8 per cent of Saskatchewan residents 15 years and older indicated they had experienced barriers to accessing health information or advice during evenings and weekends.

This information should be interpreted with caution due to the lack of precision of the estimates.

Figure 157 Access 24/7 Health Information: Provincial Comparison, 2001



Barriers to accessing health information or advice, by time of day, household population aged 15 and over, Canada and provinces, 2001

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ During regular office hours	10.1	14.1	13.2	13.9 E	11.2 E	10.3 E	8.2 E	17 E	10.7 E	11.9	10.6
■ During evenings and weekends	10.6	13 E	12.9 E	15.5 E	7.5 E	F	11.6 E	14.4 E	11.8 E	12.2	9
■ During the middle of the night	5.5 E	F	F	F	F	F	F	F	F	7.4 E	8.3 E

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

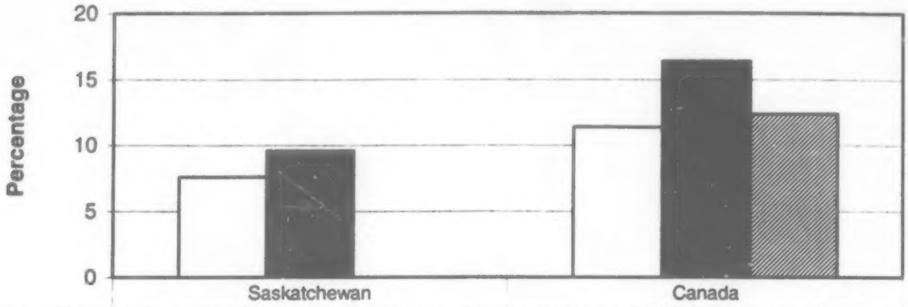
E Interpret with caution (high sampling variability)
F Data not provided due to extreme sampling variability or small sample size.

(iii) Difficulty obtaining immediate care

The percentages of Saskatchewan residents aged 15 and over who reported that they had barriers to accessing immediate care for a minor health problem by time of day were lower than the national averages in 2001. For example, 7.6 per cent and 9.6 per cent of Saskatchewan residents aged 15 and over had barriers to accessing immediate care for a minor health problem during regular office hours and during evenings and weekends, respectively compared with 11.4 per cent and 16.4 per cent of Canadians. However, Saskatchewan's percentages should be interpreted with caution.

Figure 158 Access 24/7 Immediate Care: Saskatchewan & Canada, 2001

Barriers to accessing immediate care for a minor health problem, by time of day, household population aged 15 and over, Saskatchewan and Canada, 2001



	Saskatchewan	Canada
□ During regular office hours	7.6 E	11.4
■ During evenings and weekends	9.6 E	16.4
▨ During the middle of the night	F	12.4 E

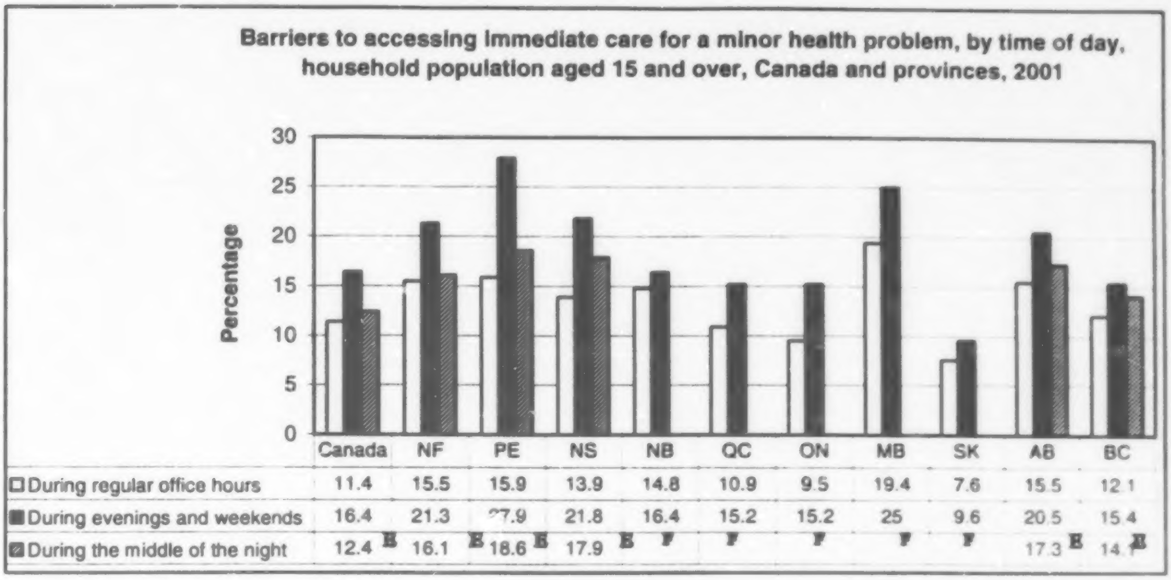
Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.

Provincial comparisons

Of all the provinces, Saskatchewan had the lowest (7.6 per cent) percentage of those aged 15 and over that had barriers to accessing immediate care for a minor health problem during regular office hours in 2001. Similarly, Saskatchewan had the lowest (9.6 per cent) percentage of persons experiencing barriers to accessing immediate care for a minor health problem during evenings and weekends.

Figure 159 Access 24/7 Immediate Care: Provincial Comparison, 2001



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ During regular office hours	11.4	15.5	15.9	13.9	14.8	10.9	9.5	19.4	7.6	15.5	12.1
■ During evenings and weekends	16.4	21.3	27.9	21.8	16.4	15.2	15.2	25	9.6	20.5	15.4
▨ During the middle of the night	12.4 E	16.1 E	18.6 E	17.9 E	F	F	F	F	F	17.3 E	14.1 E

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.

Much of the data on barriers to accessing immediate care for a minor health problem during the middle of the night were unpublished due to extreme sampling variability. The published data on barriers to accessing immediate care for a minor health problem during the middle of the night should be interpreted with caution.

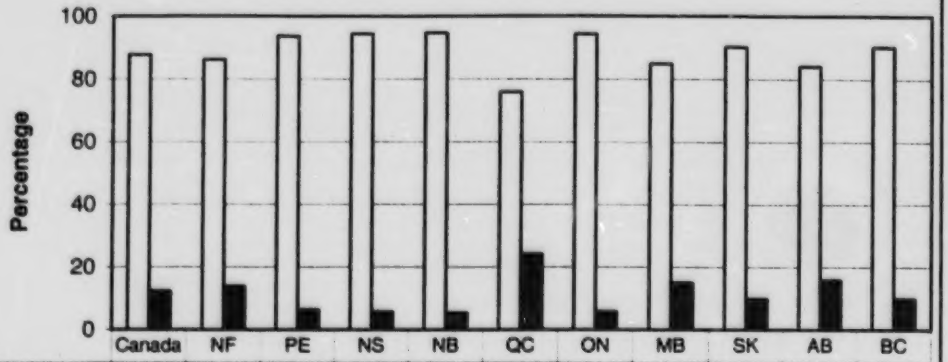
(iv) Percent having a regular family doctor

Provincial Comparisons

Bearing in mind the limitations imposed on interpreting this data due to high sampling variability rates, it can be observed that Saskatchewan and British Columbia had the fifth highest (90.2 per cent) percentage of household population aged 15 and over that had access to a regular family physician after Prince Edward Island (93.6 per cent), Ontario (94.3 per cent), Nova Scotia (94.4 per cent) and New Brunswick (94.6 per cent).

Figure 160 Access 24/7 Regular Family Physician: Provincial Comparison, 2001

Access to a regular family physician, household population aged 15 and over, Canada and provinces, 2001



	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ Regular family physician	87.7	86.2	93.6	94.4	94.6	75.9	94.3	84.8	90.2	84.1	90.2
■ No regular family physician	12.3	13.8	6.4	5.6[B]	5.4[B]	24.1	5.7	14.9	9.8	15.8	9.8

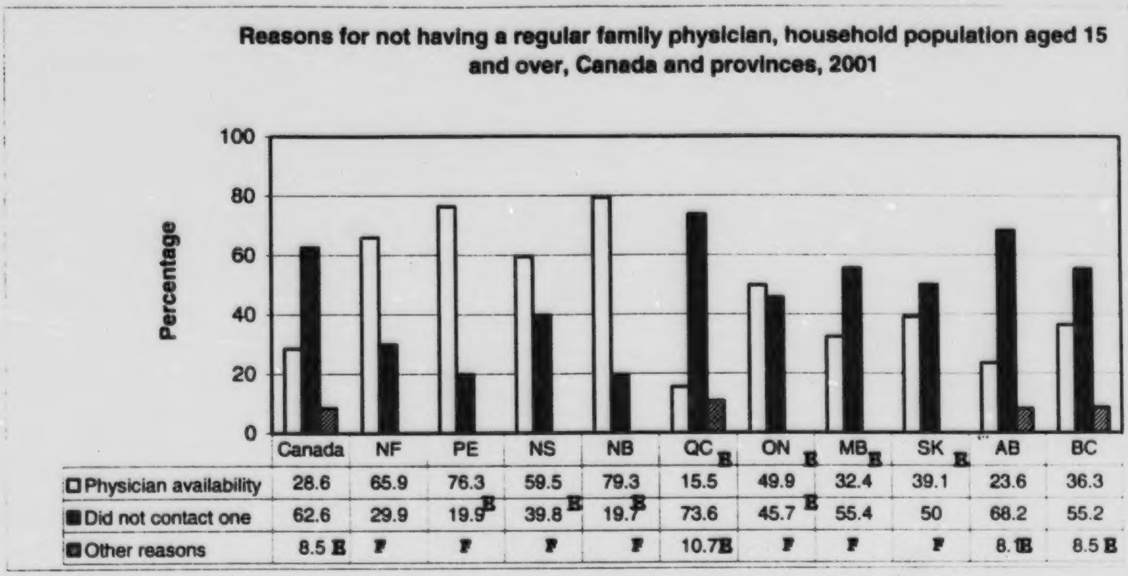
Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

[B] Interpret with caution (high sampling variability).
Some percentages may not add up to 100% due to rounding.

Approximately 39 per cent of Saskatchewan residents aged 15 and over reported physician availability as the reason for not having a regular family physician. Half of Saskatchewan respondents reported that the reason for not having a regular family physician was because they did not contact one.

F-4

Figure 161 Reasons for not Having Regular Family Physician: Provincial Comparison, 2001



	Canada	NF	PE	NS	NB	QC E	ON E	MB E	SK E	AB	BC
☐ Physician availability	28.6	65.9	76.3	59.5	79.3	15.5	49.9	32.4	39.1	23.6	36.3
■ Did not contact one	62.6	29.9	19.9 E	39.8 E	19.7 E	73.6	45.7 E	55.4	50	68.2	55.2
▨ Other reasons	8.5 E	F	F	F	F	10.7 E	F	F	F	8.1 E	8.5 E

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

E Interpret with caution (high sampling variability).
F Data not provided due to extreme sampling variability or small sample size.
Some percentages may not add up to 100% due to rounding.

Health facilities and professions are necessarily more dispersed in rural and remote areas of the country High staff turnovers, and difficulty in recruiting and retaining health care workers tends to occur in rural regions more so than in urban localities [283]. Rural and remote areas rely more on community based health services. Some of these issues may be reflected in the data on barriers to health services.

Availability, in terms of hours of operation of health services, or of after-care hours can also vary depending on where services are provided, creating unequal access to health care. There is some question in the literature, however, over whether increased availability of and access to health services results in better health outcomes, or simply greater patient satisfaction, and that other factors besides access (such as socio-economic status) influence health outcomes.

These factors can all be compounded by individual circumstance. Recent studies have indicated that people with physical disabilities do not have adequate access to primary healthcare, hospital care or long-term care services [253]. Over and above any architectural barriers (such as lack of adequate ramps etc.), or the attitudinal or knowledge related barriers disabled people may experience in accessing health care, transportation issues, and co-ordination of healthcare services remain issues.

Socio-economic status is also related to access to care, with a positive relationship between income and use of general practitioners and specialist services, and an inverse relationship between use of emergency services and admissions to hospitals being reported. Individuals with higher incomes live in environments that are more conducive to gaining access to primary care, and therefore, do not need the services of emergency and hospital admission[254].

Access to Health Care in Saskatchewan

Saskatchewan, like several other provinces, has developed several strategies and incentives designed to recruit and retain health care professionals in the province. Training in rural practice as part of graduate programs is one approach to prepare those intending pursuing a career in health care in the challenges involved in working in more remote, rural areas of the country. As such, Saskatchewan had the second lowest percentage of people expressing that there were barriers to receiving access to routine care, either in regular office hours, or during evenings and weekends, and the lowest percentage of people reporting barriers to obtaining immediate care for a minor health problem. Furthermore, the percentage of people reporting difficulties in obtaining access to health information was below the national average. Most people in the province also had access to a family physician. Of those who did not, a greater number indicated that this was simply because they had not contacted one, more so than lack of physician availability. Again issues surrounding perceived need for a physician, and the expected costs of attending a physician (in terms of lost work-time and prescription costs) are likely to be influential on access rates to a regular family physician.

Although it is unlikely that the operation of these newly developed health professional recruitment strategies are wholly responsible for these low rates, it is likely that they have had an impact on the public perception of what is being done to improve access to health services in the province. The fact that Saskatchewan is a largely rural province, and indeed for many people geographical distance remains a problem in accessing care, this does not appear to be a major barrier as expressed by the current indicator. Again, it is difficult to interpret whether this reflects satisfaction with the availability of services, or whether for the majority there are few personal constraints (such as financial or physical) creating barriers to accessing routine health care in the province.

The fact that inter-provincial differences do exist in perceived barriers to accessing routine health care – whether that be services or information, suggests that indeed the there may be some interplay of the factors discussed above in terms of constraining access to health care for certain members of the population. The available data is unable to ascertain, however, what the source of these provincial differences may be.

5.3 Readmission

(a) Pneumonia

Limitations

Readmissions data suffers from several limitations that can affect the validity of the estimates provided. For example, data is often produced directly from the hospital records, which themselves are based on various pieces of information including doctor's notes. There are few verification checks done to ensure that the correct diagnosis was indeed made. Furthermore, several factors can be responsible for this return to hospital including the severity of the symptoms initially experienced, the degree of stability at time of discharge, individual willingness to undertake post-hospital care (which includes compliance with medication prescribed at discharge), as well as the efficacy and completeness of care during initial hospitalization. These factors limit the extent to which readmission rates can be used as an indicator of the quality of care received.

Readmission Rates as an Indicator of Quality of Care

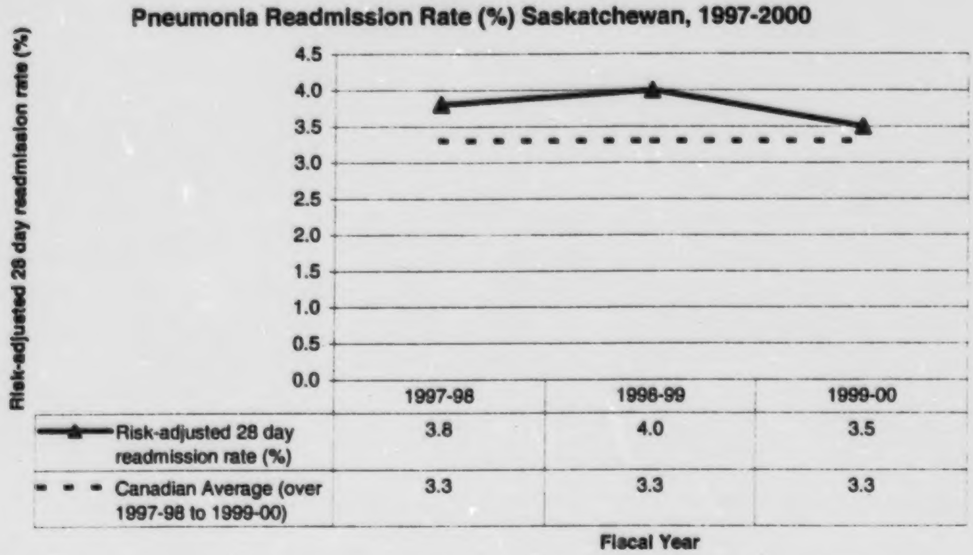
Pneumonia continues to rank as a serious cause of morbidity and mortality. Though pneumonia is fairly common in the population as a whole, it can cause serious complications for those with other health conditions, such as asthma. Hospital readmission rates for selected conditions such as pneumonia, can therefore, provide some measure of the quality of hospital care received.

Although most patients will recover at home or in other types of facilities once discharged from the hospital, some will inevitably return to the hospital within a short period because they experience further health problems or are in need of additional care [255].

Declining hospital length of stay has recently been suggested as negatively affecting patient outcomes for diseases such as pneumonia[256]. Although readmission rates can generally be explained by unmodifiable causes, and are affected by several confounder, high readmission rates for patients with defined medical problems such as pneumonia can, identify quality-of-care issues and trigger the further exploration of the availability of appropriate care in the community, and factors associated directly with hospital care and discharge procedures.

Trend

Figure 162 Pneumonia Readmission Rate: Saskatchewan Trend, 1997-2000



	1997-98	1998-99	1999-00
Risk-adjusted 28 day readmission rate (%)	3.8	4.0	3.5
Canadian Average (over 1997-98 to 1999-00)	3.3	3.3	3.3

Source: Hospital Morbidity Database, CIHI; Discharge Abstract Database, CIHI

Note: The Canadian average is pooled over three years and does not represent the average for each time point in the graph.

The annual percentage of Saskatchewan patients being readmitted to hospital within 28 days of initial hospitalization for pneumonia (adjusted for age, sex, and other co-existing illnesses) from 1997-98 to 1999-00 is shown in the figure above. The dotted line shows the Canadian three-year average over the same period (1997-98 to 1999-00). The Canadian average includes only provinces and territories for which comparable data is available and may be subject to revision once Quebec and Manitoba data are included in the analysis.

The Saskatchewan rate of readmission has varied from 3.5% to 4.0%. This degree of variation is not considered statistically significant (at a 95% confidence interval). This suggests that the variation experienced in the rates may be as a result of normal variation. Further, the Saskatchewan rate of readmission is very similar to that of the Canadian average and the differences between the two rates is not statistically significant (at a 95% confidence interval).

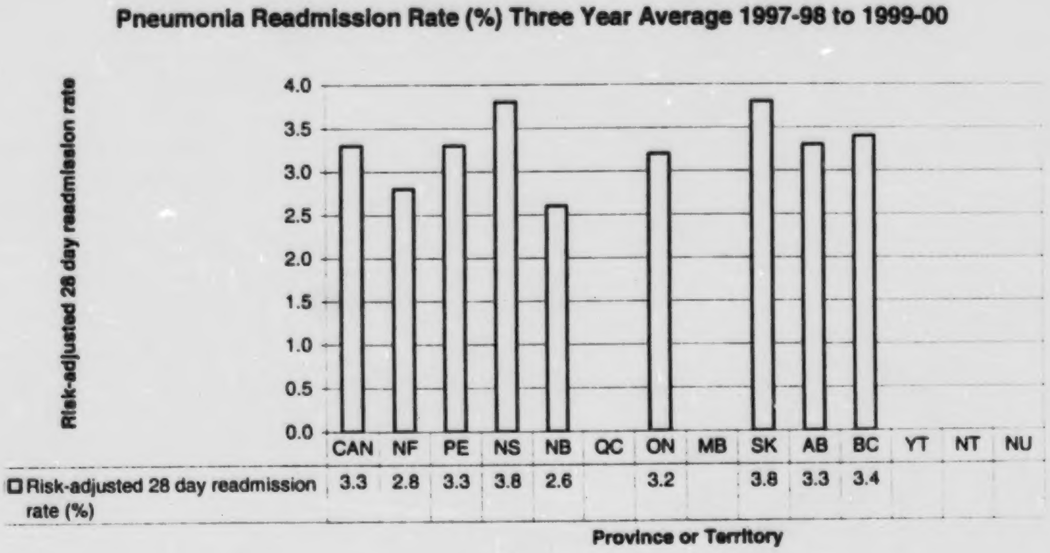
Rates of readmission on a national basis, typically reflect unplanned re-entry to hospitals, and reflect readmissions for patients resident in a region, rather than outcomes of care for hospitals in a region. As a result analysis based on where residents live, rather than where they are treated can be introduced. For example regional variations in risk factors for contracting pneumonia, in the care received prior to admission and after discharge, or in hospital documentation practices are likely to exist, all of which contribute to rates of readmission, and may limit the extent to which assessments of the quality of care patients receive in hospitals, can be made [257]. For example, the extent to which influenza immunization is available on a national basis, and the access to and acceptance of this preventative measure prior to hospitalization, can influence not only subsequent mortality due to pneumonia, but also readmission rates, especially for elderly patients with pneumonia.[258]

Age and Sex

Separate rates for males and females and by age group are not available.

Provincial Comparisons

Figure 163 Pneumonia Readmission Rate: Provincial Comparison



Source: Hospital Morbidity Database, CIHI; Discharge Abstract Database, CIHI

Note: The rates for Québec and Manitoba are forthcoming and not yet available for comparison. The rates for the Yukon, NWT and Nunavut have been suppressed due to small numbers.

Based on a three-year (1997-98 to 1999-2000) average, the percentage of patients being readmitted to hospital within 28 days of initial hospitalization for pneumonia (adjusted for age, sex, and other co-existing illnesses) by province or territory, are shown in the figure above. The Canadian average includes only provinces and territories for which comparable data is available. The Saskatchewan rate is significantly higher than that of New Brunswick, and is not significantly different from that of the other provinces with available data or the Canadian average.

Provincial & Territorial Variations in Readmission Rates

Considerable research has been conducted on readmission as a measure of quality of care, but reporting of readmission rates for defined conditions, such as pneumonia, at a provincial level within Canada is a recent direction in performance reporting.

As a performance indicator, there is relatively little variation in pneumonia readmission rates across that nation with the lowest rates in New Brunswick (2.6%) and the highest rates in Nova Scotia and Saskatchewan (3.8%). Given the relatively small variation in these rates and the large confidence intervals associated with these rates, it is difficult to make conclusions surrounding the quality of care on a provincial or national level. With the exception of New Brunswick, there is no statistically significant difference in pneumonia readmission rates either nationally or amongst any of the other provinces.

Individual hospitals have utilized pneumonia readmission rates as a performance indicator with some success [259]. This indicator appears to have been helpful for hospital administrators to monitor system effectiveness. Aggregating this performance indicator on a provincial basis reduces the sensitivity of this measure to a less than acceptable level.

Within Saskatchewan, the rate of readmission for pneumonia decreased slightly between 1997/98 (3.8%) and 1999/2000 (3.5%). This decrease is minimal and likely a result of random variation. Saskatchewan's pneumonia readmission rate remains above the national average though this difference is also very small (3.8% vs. 3.3%) and not statistically significant.

Factors Affecting Readmission Rates

Earlier research has identified a number of patient characteristics that influence readmission. These characteristics include:

- Socio-economic status[260]
- Racio-ethnicity[291]
- Compliance with medical therapy and instruction
- Length of hospital stay
- General physical and mental health.[261]

It is also believed that a lack of community and social supports may also influence the rate of hospital readmission. With the current performance indicator it is impossible to control for all of these variables. As a result, these confounding factors could unduly influence this measure. Unique to pneumonia readmission is the suggestion that shorter hospital stays are positively correlated to readmissions [295].

To the extent that compliance with medical advice influences readmission rates, the factors that play a role in the individual's decision to use prescribed information or manage their lifestyle changes necessary for recovery from pneumonia, are also likely to be of importance. Elderly patients may be more likely to misunderstand physician instructions with regards to medication instructions, as are patients with some underlying depression[262]. Provinces whose demographic profile is dominated by an elderly populace, such as Saskatchewan, may experience higher rates of pneumonia infection as well as higher rates of readmission due to treatment compliance issues. Older people are also likely to have multiple diseases and consequently experience a reoccurrence of infection that subsequently requires readmission to hospital.

Recent Canadian research has indicated that there may be an association between racio-ethnic identity and hospital readmission [297]. Given the Saskatchewan demographics, further research is required to ascertain the unique needs and issues faced by aboriginal peoples seeking healthcare services.

Therefore, in explaining regional variations in hospital care and how it may affect short- and long-term health outcomes, measures such as readmission rates should be considered in the context of other information. This information should include; patient characteristics, patient care, and the availability and access to health services both inside the hospital and in the community. The readmission rates reported for pneumonia likely relates to many factors other than the quality of care that the individual received while hospitalised.

(b) AMI

Limitations

Readmissions data of acute myocardial infarction **suffers from** ~~several~~ the same ~~limitations~~ limitations as those previously outlined for pneumonia. ~~that can affect the validity of the estimates provided. For example, data is often produced directly from the hospital records which themselves are based on various pieces of information including doctor's notes. There are few verification checks done to ensure that the correct diagnosis was indeed made. Furthermore, several factors can be responsible for this return to hospital including the severity of the symptoms initially experienced, the degree of stability at time of discharge, patient willingness to undertake post-hospital care (which includes compliance with medication prescribed at discharge), as well as the efficiency and completeness of care during initial hospitalisation. These factors limit the extent to which readmission rates can be used as an indication of the quality of care received.~~

Readmission Rates as an Indicator of Quality of Care

In terms of surviving an acute myocardial infarction (AMI), the care that patients receive in hospitals is one important factor that influences outcome and quality of life after discharge from hospital [263]. Hospital readmission rates for selected conditions such as AMI, can therefore, provide some measure of the quality of care received.

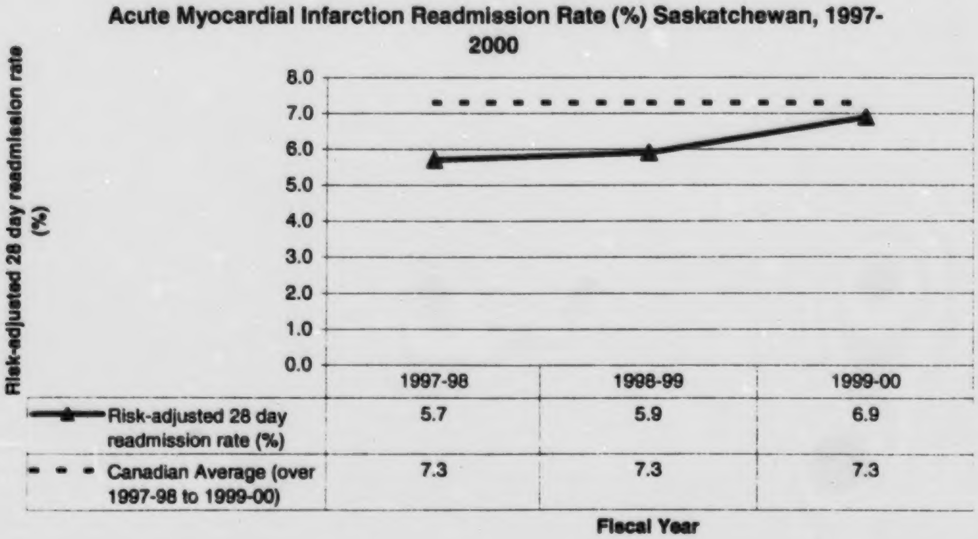
Although many patients will recover at home or in other types of facilities once discharged from the hospital, some will inevitably return to the hospital within a short period because they experience further health problems or are in need of additional care[264]. Several factors may be responsible for this return to hospital including the severity of the AMI initially experienced, individual willingness to undertake post-hospital care (which includes compliance with medication prescribed at discharge, community resources for the provision of follow-up care, as well as the efficacy and completeness of care during initial hospitalization). Comorbidity, and the overall health status of the individual is also a major contributor to readmission rates.

High readmission rates for patients with defined medical problems such as AMI can assist in identifying quality-of-care issues and trigger the further exploration of the availability of appropriate care in the community, and factors associated directly with hospital care and discharge procedures.

Trend

The annual percentage of Saskatchewan patients being readmitted to hospital within 28 days of initial hospitalization for heart attack (adjusted for age, sex, and other co-existing illnesses) from 1997-98 to 1999-00 is shown in the figure below. The dotted line shows the Canadian three-year average over the same period (1997-98 to 1999-00). The Canadian average includes only provinces and territories for which comparable data is available.

Figure 164 AMI Readmission Rate: Saskatchewan Trend, 1997-2000



	1997-98	1998-99	1999-00
Risk-adjusted 28 day readmission rate (%)	5.7	5.9	6.9
Canadian Average (over 1997-98 to 1999-00)	7.3	7.3	7.3

Source: Hospital Morbidity Database, CIHI, Discharge Abstract Database, CIHI

Note: The Canadian average is pooled over three years and does not represent the average for each time point in the graph.

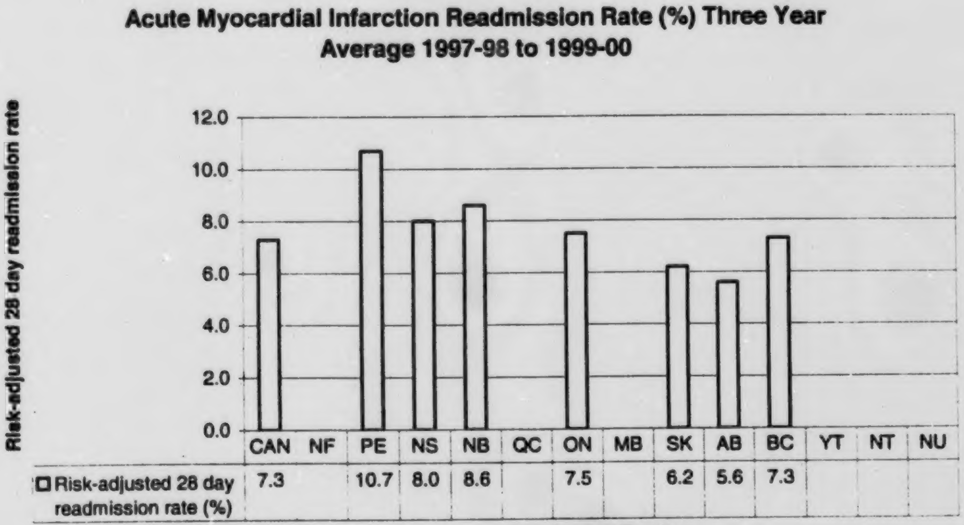
Sex and Age

Separate rates for males and females and by age group are not available.

Provincial/Territorial Comparisons

Considerable research has been conducted on readmission rates as a measure of quality of care, but reporting of rates for defined conditions, such as AMI, at the regional level within Canada is only a recent direction in performance reporting.

Figure 165 AMI Readmission Rate: Provincial Comparison



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
☐ Risk-adjusted 28 day readmission rate (%)	7.3		10.7	8.0	8.6		7.5		6.2	5.6	7.3			

Source: Hospital Morbidity Database, CIHI; Discharge Abstract Database, CIHI

Note: The readmission data for six jurisdictions (Newfoundland/Labrador, Quebec, Manitoba, and the three territories) are not included in this chart. Two of the three provincial jurisdictions will be providing information at a later date while the rates for the three territories have been suppressed due to small numbers.

The three-year average percentage of patients being readmitted to hospital within 28 days of initial hospitalization for heart attack (adjusted for age, sex, and other co-existing illnesses) using pooled data from1997-98 to 1999-2000, by province or territory, are shown in the figure above. The Canadian average includes only provinces and territories for which comparable data is available. The Saskatchewan rate is lower than that of Prince Edward Island, Nova Scotia, New Brunswick, and Ontario, and is similar to the rates for Alberta, British Columbia, and the Canadian average.

Provincial & Territorial Variations in Readmission Rates.

Using both annual and three-year averages, Saskatchewan has consistently shown a relatively low incidence of AMI readmission (6.2%) compared to either the national average (7.3%) or other provincial jurisdictions. Among the provincial jurisdictions, only Alberta experienced a lower rate of AMI readmission during the three-year study period (5.6%). Though the actual rates for Saskatchewan have been lower than those of other jurisdictions, the difference has not been statistically significant and possibly reflects expected variation in rates.

Though Saskatchewan as a whole has comparatively low AMI readmission rates, this rate has climbed slightly over the last three years from 5.7% to 6.9%. Again, this increase is not considered statistically significant and may just be a reflection of expected variability.

The reasons for provincial variations may be attributed to a number of factors of which the quality of care during the initial hospital stay is but one. For example, patient characteristics, the availability of appropriate diagnostic and other technological equipment may affect the chances of readmission after hospitalization for an AMI, as too may the follow-up care received after discharge. Furthermore, the risk factors that influence provincial differences in AMI rates are also likely to contribute to different provincial estimates in readmission rates for the disease as well.

Factors Affecting Readmission Rates

Earlier research has identified a number of patient characteristics that influence readmission. These characteristics include:

- Socio-economic status[265]
- Ethnicity [301]
- Patient compliance with medical therapy and instruction
- Length of hospital stay
- General physical and mental health.[266]

It is also believed that a lack of community and social supports may also influence the rate of hospital readmission. The current methodology does not take all of these factors into account.

It is recognized that Aboriginal peoples tend to experience health and social conditions that may put them at increased risk for both experiencing an AMI and subsequent readmission[267].

Therefore, in explaining regional variations in hospital care and how it may affect short- and long-term health outcomes, measures such as readmission rates should be considered in the context of other information, such as patient characteristics, patient care, and the availability and access to health services in and out of hospital. The readmission rates reported for AMI may be reflective of more than the quality of care that the individual received while hospitalised. For example, patient age, severity of illness and the presence of other health conditions have all been indicated as being predictive of unplanned readmissions[268]. The use of readmission rates, however, for defined conditions such as AMI remains useful to monitor, as high rates of readmission raise questions about the quality of care received. Such findings can serve as a basis for future exploration and evaluation that may reduce the impact that diseases such as AMI have provincially and at the national level in Canada.

(c) Ambulatory Care Sensitive Conditions

Long-term health conditions such as diabetes, asthma, alcohol/drug dependence and abuse, and emotional disorders such as neuroses, and depression, can often be managed with timely and effective treatment in the community, without hospitalization via effective preventive and primary care that is community based in origin. Such conditions are referred to as "ambulatory care sensitive conditions". Hospitalization rates for these conditions are one indicator of appropriate access to community-based care. Improvements in patient health and reduced costs from efficient use of resources are the main outcome goals of increased access to community-based care.

Limitations

One way to measure appropriate access to care is to examine hospitalization rates for Ambulatory Care Sensitive (ACS) conditions; however, these rates are also affected by the severity of the conditions and community context. A limitation, therefore of this indicator is that it is not sensitive enough to answer questions on what proportion of people admitted to the hospital require unique hospital services, and how often is admission a reflection of poor ambulatory care. Furthermore, a decrease in hospitalizations for ambulatory care sensitive (ACS) conditions could also be related to improved treatments for these conditions, or an overall reduced incidence of these diseases, or as a result of several combined determinants of health. Or indeed, declining rates could also be due to increased rates of death before admission.

Changes in the availability of beds can also impact upon hospitalization rates. As too may the likelihood of individual patients to seek health care, or individual physician practices, which may affect rates of hospitalizations for these conditions. Given all the factors that may have a role to play, it is difficult to assess what contribution the various factors have in reducing the rate of hospitalization for ACS conditions.

Bearing these limitations in mind, the following indicator remains an important addition to other measures of health service status as the research literature continues to support the suggestion that improving access to care is more likely than these other factors to reduce hospitalization rates for ACS conditions [269].

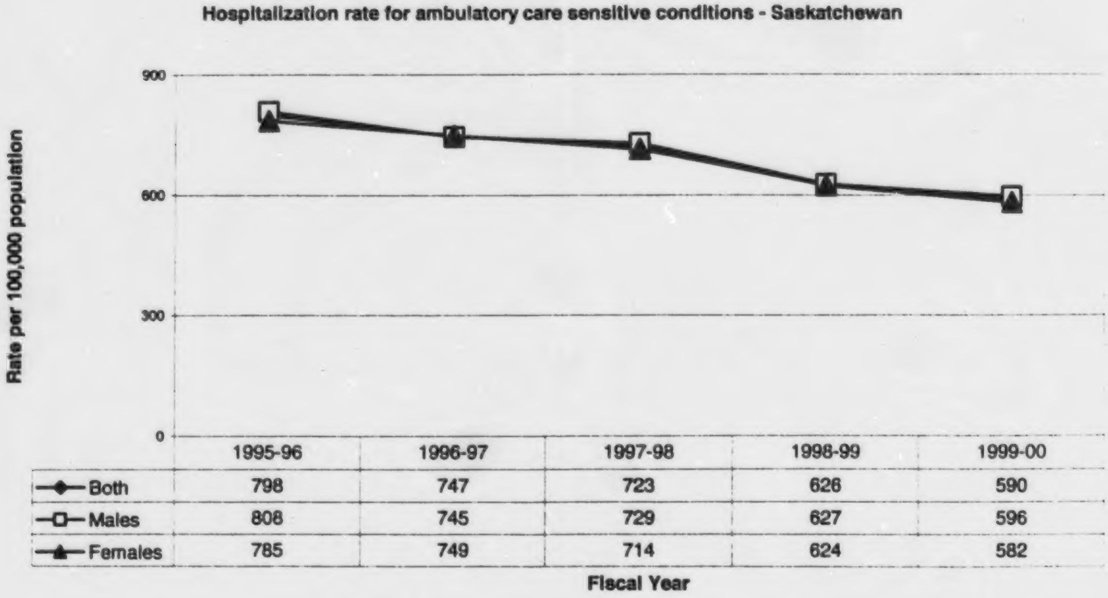
ACS Conditions as an Indicator of Quality of Care

The availability of and access to community based preventive care programs is likely to vary on a geographical basis, with expected differences in rural versus urban locations expected (health care delivery in rural communities is complicated by poverty, inadequate transportation, large geographical distances, an aging population base, and rural economic decline)[270]. Therefore, tracking hospitalization rates for these conditions can provide an indication of the accessibility and quality of community-based care, as well as hospital admitting practice and the prevalence of chronic health conditions in different locales.

Trend

The hospitalization rate of Saskatchewan residents for ambulatory care sensitive conditions has consistently decreased over the five-year time period from 1995-96 to 1999-00. The hospitalization rates for Saskatchewan residents are greater than those for the general Canadian population, although the gap has been decreasing over time. Without information on potential changes in coding practices over the years, however, caution is warranted in the interpretation of this trend as being reflective of any significant differences in access to care.

Figure 166 Ambulatory Care Sensitive Conditions: Saskatchewan Trend, 1995-2000



	1995-96	1996-97	1997-98	1998-99	1999-00
◆ Both	798	747	723	626	590
□ Males	808	745	729	627	596
▲ Females	785	749	714	624	582

Source: Hospital Morbidity Discharge Database, CIHI Census, Statistics Canada

Temporal trends present in both Saskatchewan, and nationally throughout Canada suggest that there has been a relative increase in the access to care that has ultimately reduced hospitalization rates for ACS conditions.

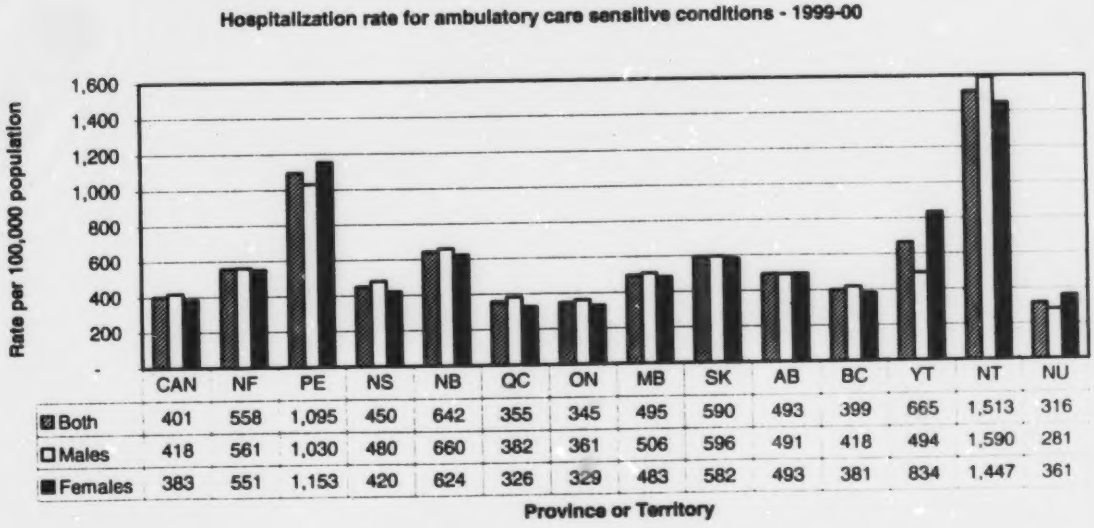
The hospitalization rate for ACS conditions in Saskatchewan may in part be reflective of the province's large rural based population, which contributes significantly to its demographic profile. Indeed, rural/urban divides in limitations in the ambulatory care system are well documented in the literature and suggest that an increased burden of avoidable secondary complications and disease progression among residents of rural areas is common [271]. Although changes over time can provide some indication of impact of community and home based services, it is regional differences that are most illuminating in the extent that they provoke further study into the accessibility and quality of community-based care, hospital admitting practices or the prevalence and acuity of these chronic health conditions.

There is not a significant difference between rates of hospitalization for ambulatory care sensitive conditions for males and females, although the rates for males are generally slightly higher than those of females for Saskatchewan residents as well as in the general Canadian population.

Provincial Comparisons

For 1999-00, the hospitalization rate for Saskatchewan residents is higher than that of most provinces and territories. Nunavut, Ontario and Quebec had the lowest rates of hospitalization.

Figure 167 Ambulatory Care Sensitive Conditions: Provincial Comparison, 1999-00



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	401	558	1,095	450	642	355	345	495	590	493	399	665	1,513	316
☐ Males	418	561	1,030	480	660	382	361	506	596	491	418	494	1,590	281
■ Females	383	551	1,153	420	624	326	329	483	582	493	381	834	1,447	361

Source: Hospital Morbidity Discharge Database, CIHI Census, Statistics Canada

Note: Rates for the Yukon Territory, the Northwest Territories and Nunavut should be interpreted with caution due to a small underlying count.

High rates of hospital admissions for ACS conditions may provide indirect evidence of problems with patient access to primary healthcare, inadequate skills and resources, disconnection with specialist services in these areas, variance in prevalence of various conditions or indeed other reasons which limit the extent to which the trends can be interpreted as due to improvements in access to services for ACS conditions.

Rates of hospitalization for ACS conditions vary among regions in the province and across the country. Variations may be the result of differences in preventive care services, the control of an acute episodic illness, and the management of a chronic condition, which together can impact upon the need for hospitalization.

The provision of effective and easily accessible community based care initiatives for ACS conditions are one way of decreasing the economic and social burden that chronic conditions place on Canada at the provincial and national level. Several such population health initiatives are already in place within the province. For example, Saskatchewan's Population Health Branch supports programs within the province to reduce the risk conditions that contribute to the development of Type 2 diabetes, create social and physical environments that enhance healthy choices, and provide help to individuals, families and communities to take action to prevent diabetes.

5.4 Are People Satisfied with the Services they Receive?

For the purposes of this section we will focus on the percentage of the adult population (aged 15 and older) who reported excellent or very good quality of care received and who rated themselves as either very satisfied or somewhat satisfied with the quality of care for:
(a) overall health services received
(b) services received in hospital
(c) services received from a family doctor or other physician
(d) community-based services received.

All information for the above measures is reported by sex. There is no trend information available.

(a) Overall health care services received

Nearly eighty-one per cent of Saskatchewan residents and 75.6% of Canadian residents reported receiving some type of health care service in the previous twelve months. In the following analysis, the percentages are calculated based on the number of people who received health care services rather than the entire population.

Almost eighty-six per cent of Saskatchewan residents and 84.4% of Canadian residents who received health care services in the previous twelve months rated the quality of health care service as excellent or very good.

Approximately eighty-five per cent of Saskatchewan residents and 84.6% of Canadian residents who received health care services in the previous twelve months were very or somewhat satisfied with the health care services received.

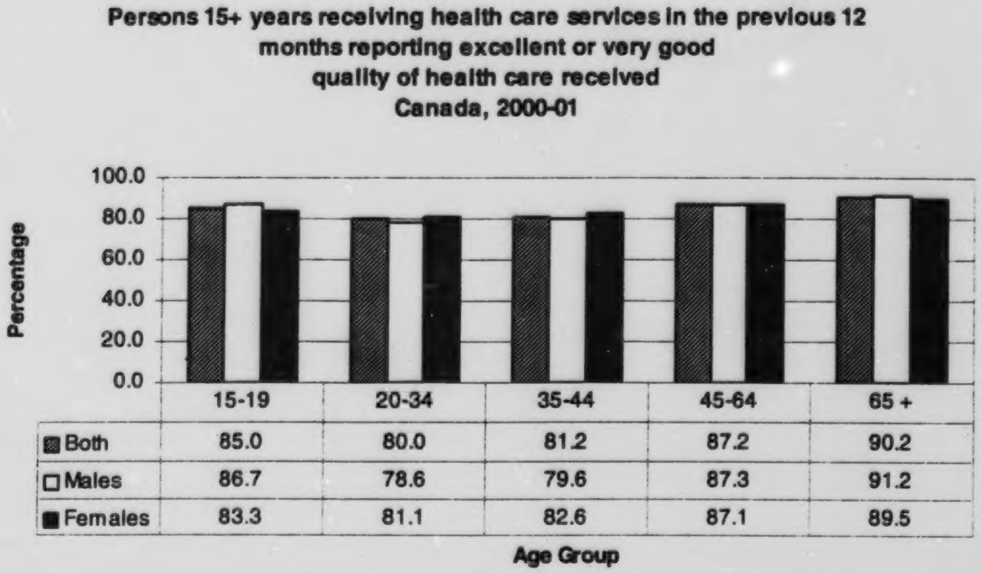
Percentage of adult population who report the quality of health care services received in the previous 12 months as excellent or very good.

In most age-sex categories, the percentage of Saskatchewan residents reporting excellent or very good quality of health care services is about the same as the Canadian average. The exceptions are residents aged 20-34 and 35-44 years.

In Saskatchewan, the age group with the highest percentage reporting an excellent or very good quality of health care service was the 15-19 age group, while in Canada it was the 65 plus age group. In Saskatchewan as well as in Canada, the 20 to 34 year age group had the lowest percentage of people reporting that they had received excellent or very good quality of health care.

Saskatchewan males between the ages of 20-34 were above the Canadian average in reporting excellent or very good quality of health care. All Saskatchewan residents aged 65 plus were below the Canadian average for reporting the same. Saskatchewan residents between the ages of 15-19 and 20-34 age had a higher percentage of males reporting excellent or very good quality of health care services, whereas the situation was reversed in the older age groups, with the exception of the 65 plus age group.

Figure 168 Quality of Health Care: Canada 2000-01



Persons 15+ years receiving health care services in the previous 12 months reporting excellent or very good quality of health care received Canada, 2000-01

	15-19	20-34	35-44	45-64	65 +
▨ Both	85.0	80.0	81.2	87.2	90.2
☐ Males	86.7	78.6	79.6	87.3	91.2
■ Females	83.3	81.1	82.6	87.1	89.5

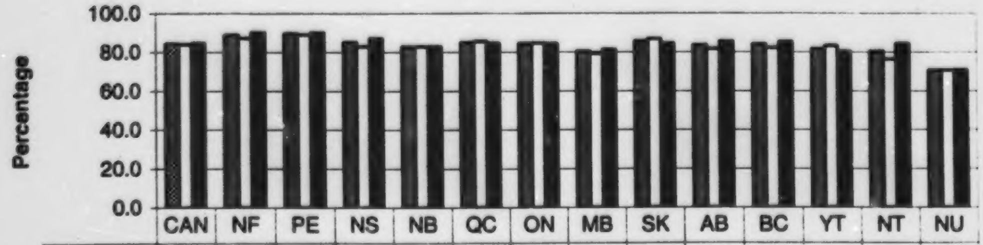
Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

Saskatchewan has about the same percentage of respondents reporting that they had received excellent or very good quality of health care service as many of the other provinces and territories. Residents of Newfoundland and Prince Edward Island are more likely than Saskatchewan residents to report excellent or very good quality of health care.

A similar proportion of males and females in most provinces and territories report excellent or very good quality of health care services they received.

Figure 159 Quality of Health Care: Provincial Comparison, 2000-01



Persons 15+ years receiving health care services in the previous 12 months reporting excellent or very good quality of health care received, 2000-01

	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
■ Both	84.4	88.9	89.6	85.3	82.8	85.0	84.5	80.3	85.6	83.6	84.0	81.7	80.5	70.8
☐ Males	84.0	87.3	89.0	83.0	82.8	85.5	84.6	79.2	86.8	81.7	82.3	83.3	76.5	70.7
▨ Females	84.7	90.3	90.1	87.2	82.9	84.6	84.4	81.2	84.5	85.4	85.3	80.3	84.3	70.9

Province or Territory

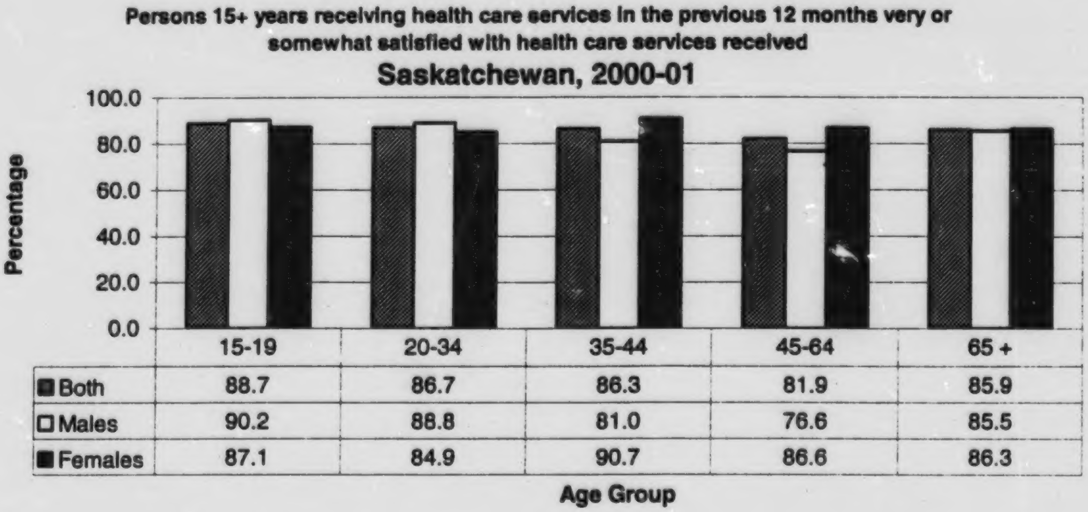
Source: Canadian Community Health Survey Cycle 1.1 2000

Percentage of adult population who rate themselves as very satisfied or somewhat satisfied with the way in which health care services received in the previous 12 months were provided.

The percentage of the adult population in most age-sex categories for Saskatchewan residents that were very or somewhat satisfied with health care services received was about the same as the general Canadian population. Younger people in Saskatchewan (those aged 15 to 19) were more likely than people in other age groups to report being very or somewhat satisfied with the health care services they received. This was the reverse for the Canadian population, where those people aged 65 plus were more likely then people in other age groups to report the same.

Females in the 35-44 age group were above the Canadian average of those reporting very or somewhat satisfied with health care services that they received. Males in the 45-64 age group were below the general Canadian population in the same category. For Saskatchewan, a higher proportion of males than females in the 15-19 and 20-34 age groups reported being very or somewhat satisfied with the health care services they received. The situation was reversed in the older age groups.

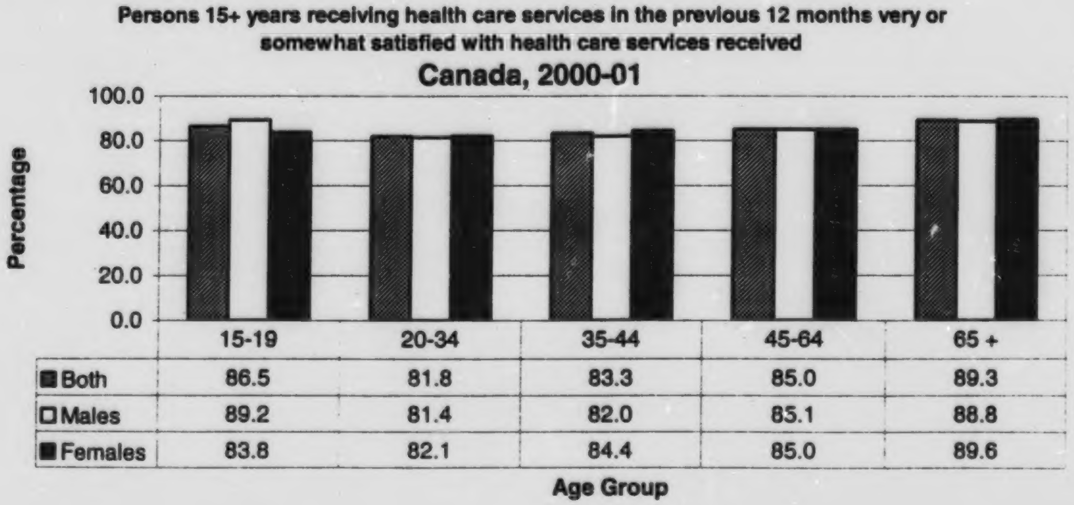
Figure 170 Patient Satisfaction-Health Care Services: Saskatchewan by Age & Sex, 2000-01



	15-19	20-34	35-44	45-64	65 +
▨ Both	88.7	86.7	86.3	81.9	85.9
☐ Males	90.2	88.8	81.0	76.6	85.5
■ Females	87.1	84.9	90.7	86.6	86.3

Source: Canadian Community Health Survey Cycle 1.1 2000

Figure 171 Patient Satisfaction-Health Care Services: Canada by Age & Sex, 2000-01



	15-19	20-34	35-44	45-64	65 +
▨ Both	86.5	81.8	83.3	85.0	89.3
☐ Males	89.2	81.4	82.0	85.1	88.8
■ Females	83.8	82.1	84.4	85.0	89.6

Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

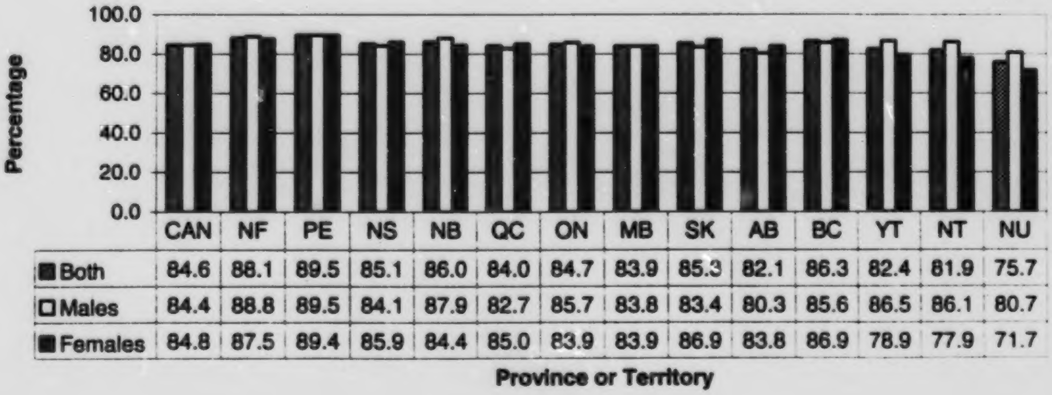
Saskatchewan has about the same percentage of respondents reporting they are very or somewhat satisfied with health care service received as many of the other provinces and territories. Residents of Newfoundland and Prince Edward Island are more likely to report that they are very or somewhat satisfied with health services.

Saskatchewan had a lower percentage of males reporting that they were very or somewhat satisfied with the quality of health care services received than Newfoundland, Prince Edward Island and New Brunswick and about the same percentage as the other provinces and territories.

Saskatchewan had a higher percentage of females reporting that they were very or somewhat satisfied with health care service received than Ontario and the three territories, and about the same percentage as the remaining provinces.

Figure 172 Patient Satisfaction-Health Care Services: Provincial Comparison, 2000-01

Persons 15+ years receiving health care services in the previous 12 months very or somewhat satisfied with health care services received, 2000-01



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
■ Both	84.6	88.1	89.5	85.1	86.0	84.0	84.7	83.9	85.3	82.1	86.3	82.4	81.9	75.7
☐ Males	84.4	88.8	89.5	84.1	87.9	82.7	85.7	83.8	83.4	80.3	85.6	86.5	86.1	80.7
■ Females	84.8	87.5	89.4	85.9	84.4	85.0	83.9	83.9	86.9	83.8	86.9	78.9	77.9	71.7

Source: Canadian Community Health Survey Cycle 1.1 2000

(b) Services received in hospital

Thirty-two percent of Saskatchewan residents and 25.9% of Canadian residents reported receiving some type of hospital service, either as an inpatient, an outpatient or an emergency room patient, in the previous twelve months. In the following analysis, the percentages are calculated based on the number of people who received hospital services rather than the entire population.

About eighty-one per cent of Saskatchewan residents and 80.2% of Canadian residents who received hospital care in the previous twelve months rated the quality of hospital care received as excellent or very good.

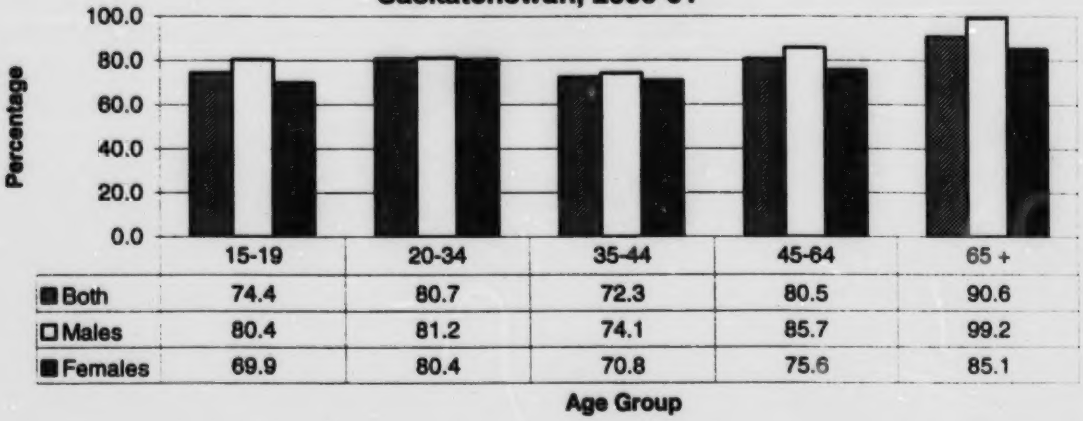
Nearly eighty-three per cent of Saskatchewan residents and 79.5% of Canadian residents who received hospital care in the previous twelve months were very or somewhat satisfied with the hospital care that they received.

Percentage of adult population who report the quality of hospital services received in the previous 12 months as excellent or very good.

For both Saskatchewan and Canada, people who were 65 years of age and older were more likely than people in other age groups, to report excellent or very good quality of hospital care received.

In most of the age-sex groups, the percentage of Saskatchewan residents reporting excellent or very good quality of hospital care received is about the same as the percentage for the Canadian population. A higher percentage of Saskatchewan males aged 65 years or older report excellent or very good quality hospital care than the general Canadian population. The percentage of Saskatchewan females in the 45 to 64 and 65 plus age groups reporting excellent or very good quality hospital services is lower than the Canadian average in the same age-sex groups. In general, a lower percentage of females than males report that they had received excellent or very good quality of hospital care in Saskatchewan.

Figure 173 Quality of Hospital Care: Saskatchewan by Age & Sex, 2000-01



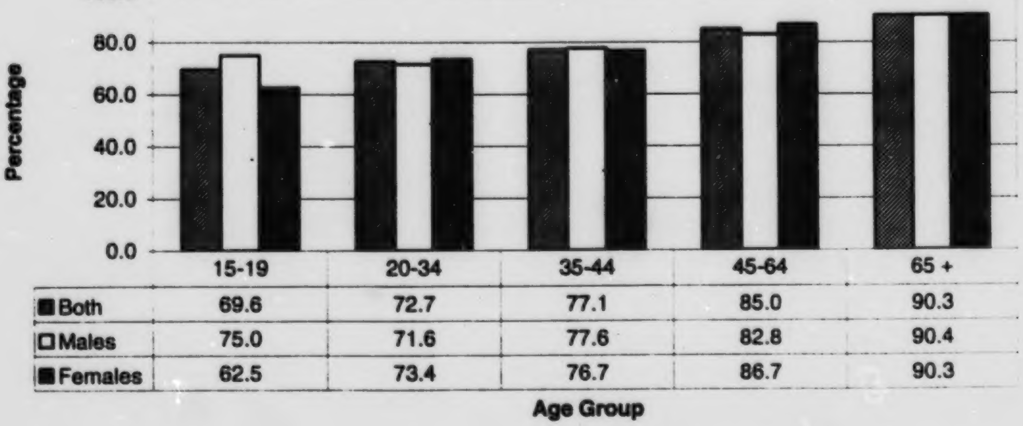
Persons 15+ years receiving hospital services in the previous 12 months reporting excellent or very good quality of hospital care received

Saskatchewan, 2000-01

	15-19	20-34	35-44	45-64	65 +
■ Both	74.4	80.7	72.3	80.5	90.6
□ Males	80.4	81.2	74.1	85.7	99.2
■ Females	69.9	80.4	70.8	75.6	85.1

Source: Canadian Community Health Survey Cycle 1.1 2000

Figure 174 Quality of Hospital Care: Canada by Age & Sex, 2000-01



Persons 15+ years receiving hospital services in the previous 12 months reporting excellent or very good quality of hospital care received

Canada, 2000-01

	15-19	20-34	35-44	45-64	65 +
■ Both	69.6	72.7	77.1	85.0	90.3
□ Males	75.0	71.6	77.6	82.8	90.4
■ Females	62.5	73.4	76.7	86.7	90.3

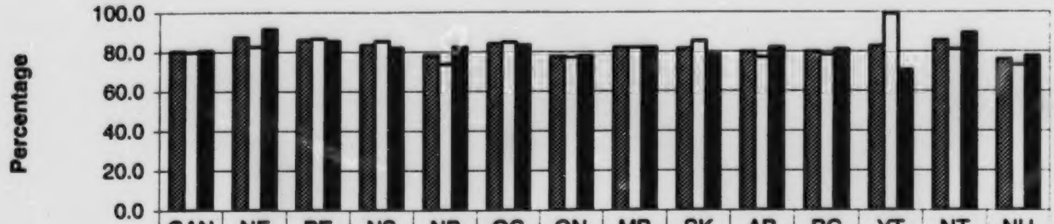
Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

Saskatchewan had approximately the same percentage of respondents reporting excellent or very good quality of hospital care service received as other provinces and territories regardless of sex.

Figure 175 Quality of Hospital Care: Provincial Comparison, 2000-01

Persons 15+ years receiving hospital services in the previous 12 months reporting excellent or very good quality of hospital care received, 2000-01



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	80.2	87.2	85.9	83.3	78.1	83.8	77.4	82.0	81.2	79.6	79.6	82.6	85.4	75.7
☐ Males	79.8	82.5	86.7	85.3	73.5	84.6	77.0	82.0	85.2	77.0	78.2	99.0	80.9	73.0
■ Females	80.5	91.4	85.3	81.8	82.1	83.2	77.7	82.0	78.2	81.8	80.8	70.5	89.2	77.4

Province or Territory

Source: Canadian Community Health Survey Cycle 1.1 2000

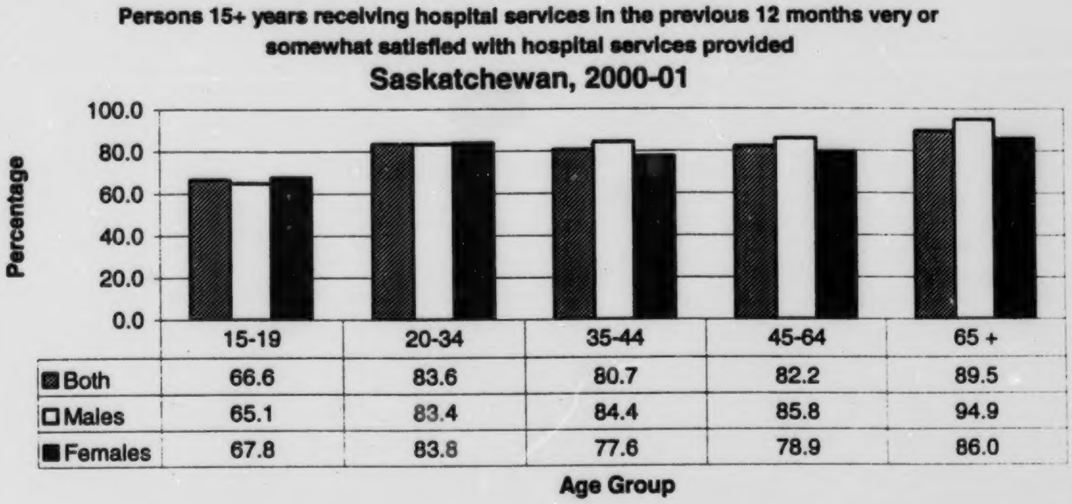
Note: Estimates for Nunavut, Males and Both, should be interpreted with caution

Percentage of adult population who rate themselves as very satisfied or somewhat satisfied with the way in which hospital services received in the previous 12 months were provided.

In most age-sex categories, the percentage of Saskatchewan residents who reported being very or somewhat satisfied with hospital services provided in the previous twelve months is about the same as the general Canadian population. However, there were more Saskatchewan males in all age groups (except 15-19 years) who were very or somewhat satisfied with hospital services in the province in comparison to the national average for men of the same age in Canada.

In Saskatchewan, a higher proportion of males than females in the 35 to 44, 45 to 64, and 65 plus age groups report being very or somewhat satisfied with the quality of hospital services. This pattern is not evident in the general Canadian population.

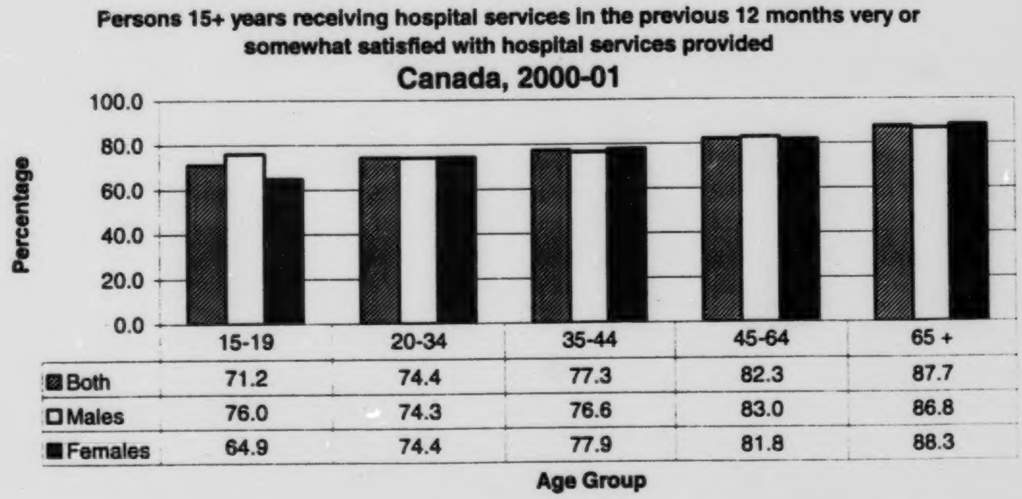
Figure 176 Patient Satisfaction-Hospital Services: Saskatchewan by Age & Sex, 2000-01



	15-19	20-34	35-44	45-64	65 +
▨ Both	66.6	83.6	80.7	82.2	89.5
☐ Males	65.1	83.4	84.4	85.8	94.9
■ Females	67.8	83.8	77.6	78.9	86.0

Source: Canadian Community Health Survey Cycle 1.1 2000

Figure 177 Patient Satisfaction-Hospital Services: Canada by Age & Sex, 2000-01



	15-19	20-34	35-44	45-64	65 +
▨ Both	71.2	74.4	77.3	82.3	87.7
☐ Males	76.0	74.3	76.6	83.0	86.8
■ Females	64.9	74.4	77.9	81.8	88.3

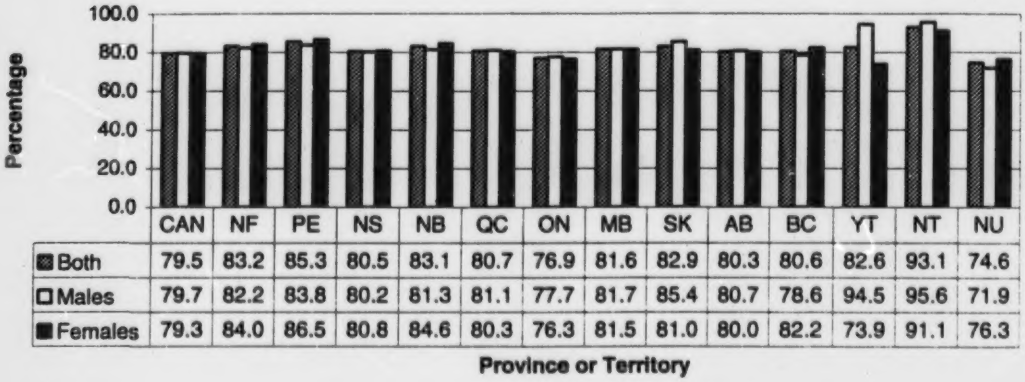
Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

The percentage of respondents who rate themselves as very or somewhat satisfied with the way in which hospital services received in the previous 12 months were provided is somewhat similar in most provinces and territories. Very little difference in gender (with the exception of the Yukon Territory) is expressed in the satisfaction ratings of hospital services.

Figure 178 Patient Satisfaction-Hospital Services: Provincial Comparison, 2000-01

Persons 15+ years receiving hospital services in the previous 12 months very or somewhat satisfied with hospital services provided, 2000-01



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	79.5	83.2	85.3	80.5	83.1	80.7	76.9	81.6	82.9	80.3	80.6	82.6	93.1	74.6
☐ Males	79.7	82.2	83.8	80.2	81.3	81.1	77.7	81.7	85.4	80.7	78.6	94.5	95.6	71.9
■ Females	79.3	84.0	86.5	80.8	84.6	80.3	76.3	81.5	81.0	80.0	82.2	73.9	91.1	76.3

Source: Canadian Community Health Survey Cycle 1.1 2000

(c) Services received from a family doctor or other physician

The percentage of Saskatchewan residents who received health care services from a family doctor or other physician (not including hospital visits) in the previous twelve months is 70.6%. The corresponding percentage for the general Canadian population is 64.7%. In the following analysis, the percentages are based on the people who received physician services rather than the entire population.

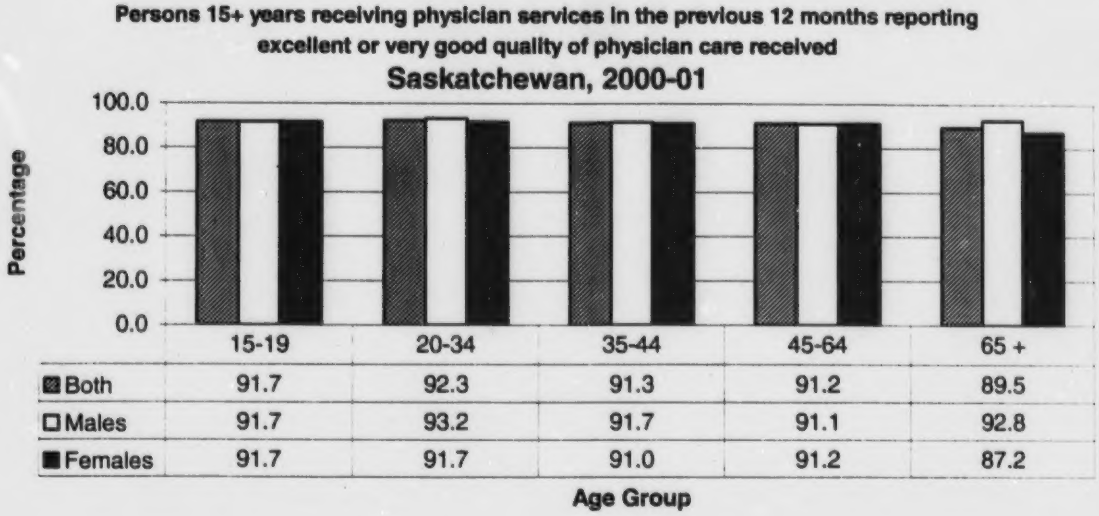
Approximately 91% of Saskatchewan residents and 89.7% of Canadian residents who received family doctor or other physician care in the previous twelve months rated the quality of family doctor or other physician care as excellent or very good.

Nearly 93% of Saskatchewan residents and 90.9% of Canadian residents who received family doctor or other physician care in the previous twelve months were very or somewhat satisfied with the family doctor or other physician care provided.

Percentage of adult population who report the quality of the most recent family doctor or other physician care received in the previous 12 months as excellent or very good.

The percentage of Saskatchewan respondents rating the most recent service received from a physician as excellent or very good is about the same as the Canadian average in most age-sex categories. The exceptions are among individuals aged 20 to 34 (higher than the Canadian average) and aged 65 plus (lower than the Canadian average).

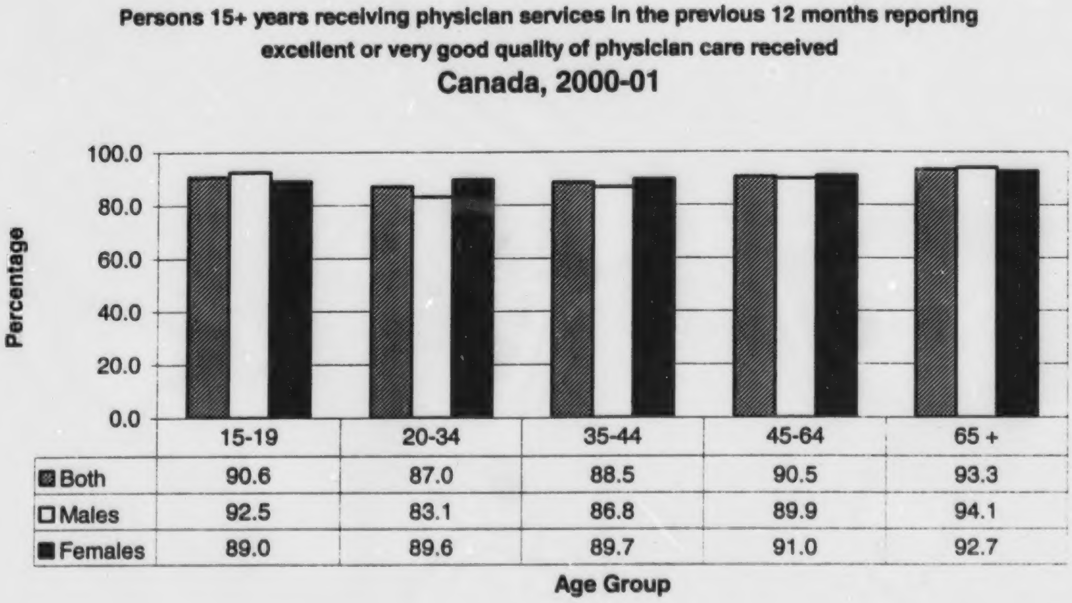
Figure 179 Quality of Physician Services: Saskatchewan by Age & Sex, 2000-01



	15-19	20-34	35-44	45-64	65 +
▨ Both	91.7	92.3	91.3	91.2	89.5
☐ Males	91.7	93.2	91.7	91.1	92.8
■ Females	91.7	91.7	91.0	91.2	87.2

Source: Canadian Community Health Survey Cycle 1.1 2000

Figure 180 Quality of Physician Services: Canada by Age & Sex, 2000-01



Persons 15+ years receiving physician services in the previous 12 months reporting excellent or very good quality of physician care received

Canada, 2000-01

	15-19	20-34	35-44	45-64	65 +
▨ Both	90.6	87.0	88.5	90.5	93.3
☐ Males	92.5	83.1	86.8	89.9	94.1
■ Females	89.0	89.6	89.7	91.0	92.7

Source: Canadian Community Health Survey Cycle 1.1 2000

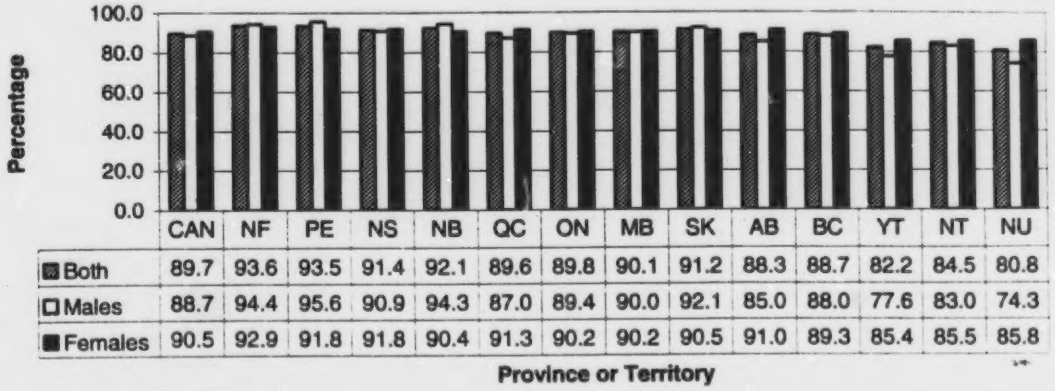
Provincial/Territorial Comparisons

A similar proportion of Saskatchewan residents as those from other provinces report excellent or very good quality physician care.

Saskatchewan males were more likely to report excellent or very good quality physician care than Quebec, Alberta, British Columbia, Yukon, and Nunavut males. There is no significant difference in the proportion of females reporting excellent or very good quality physician care in the provinces and territories.

Figure 181 Quality of Physician Services: Provincial Comparison, 2000-01

Persons 15+ years receiving physician services in the previous 12 months reporting excellent or very good quality of physician care received, 2000-01



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	89.7	93.6	93.5	91.4	92.1	89.6	89.8	90.1	91.2	88.3	88.7	82.2	84.5	80.8
☐ Males	88.7	94.4	95.6	90.9	94.3	87.0	89.4	90.0	92.1	85.0	88.0	77.6	83.0	74.3
■ Females	90.5	92.9	91.8	91.8	90.4	91.3	90.2	90.2	90.5	91.0	89.3	85.4	85.5	85.8

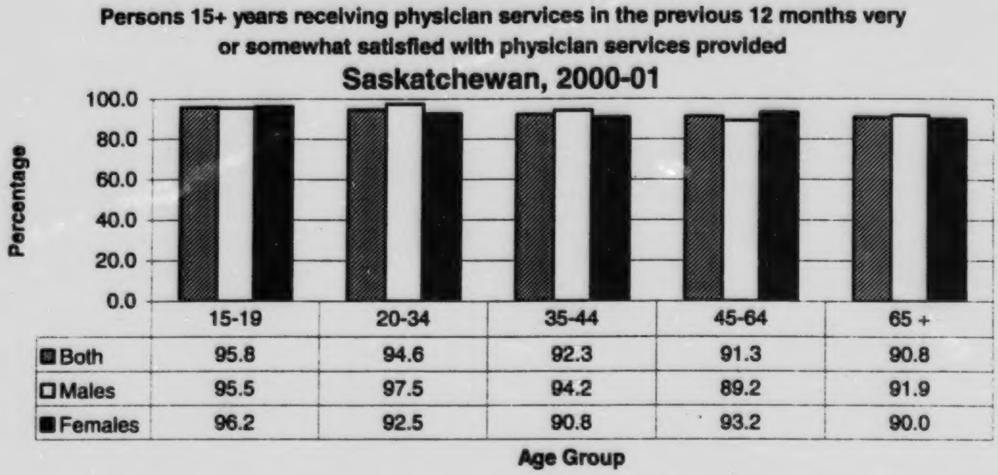
Source: Canadian Community Health Survey Cycle 1.1 2000

Note: Estimates for Nunavut males and females must be interpreted with caution.

Percentage of adult population who rate themselves as very satisfied or somewhat satisfied with the way in which the most recent family doctor or other physician care received in the previous 12 months was provided.

For most age-sex categories, the proportion of Saskatchewan residents who are very or somewhat satisfied with their most recent physician care is about the same as for Canadians. The exceptions are Saskatchewan females aged 15 to 19, individuals aged 20 to 34, and males aged 20 to 34, who are more likely than their Canadian counterparts to report being very or somewhat satisfied with the most recent physician care received.

Figure 182 Patient Satisfaction-Physician Services: Saskatchewan by Age & Sex, 2000-01



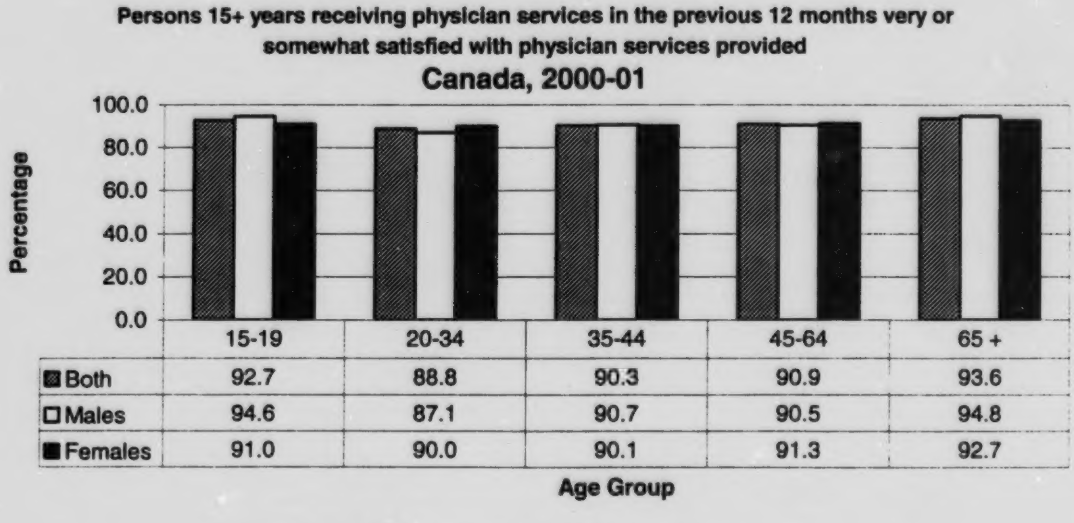
Persons 15+ years receiving physician services in the previous 12 months very or somewhat satisfied with physician services provided

Saskatchewan, 2000-01

Age Group	15-19	20-34	35-44	45-64	65 +
▨ Both	95.8	94.6	92.3	91.3	90.8
☐ Males	95.5	97.5	94.2	89.2	91.9
■ Females	96.2	92.5	90.8	93.2	90.0

Source: Canadian Community Health Survey Cycle 1.1 2000

Figure 183 Patient Satisfaction-Physician Services: Canada by Age & Sex, 2000-01



Persons 15+ years receiving physician services in the previous 12 months very or somewhat satisfied with physician services provided

Canada, 2000-01

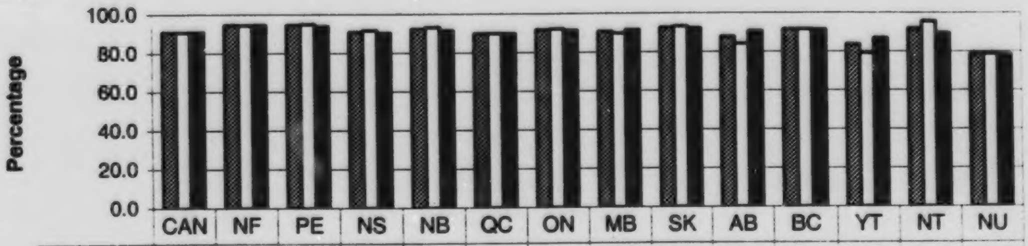
Age Group	15-19	20-34	35-44	45-64	65 +
▨ Both	92.7	88.8	90.3	90.9	93.6
☐ Males	94.6	87.1	90.7	90.5	94.8
■ Females	91.0	90.0	90.1	91.3	92.7

Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

Compared to other provinces and territories, Saskatchewan had the third highest rates of residents reporting very or somewhat satisfied with the physician services they received, second only to residents of Newfoundland and PEI. The percentage of Saskatchewan residents reporting satisfaction (92.6%) was also slightly higher than the national percentage (90.9%).

Figure 184 Patient Satisfaction-Physician Services: Provincial Comparison, 2000-01



Persons 15+ years receiving physician services in the previous 12 months very or somewhat satisfied with physician services provided, 2000-01

	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	90.9	94.5	94.5	90.9	92.3	89.8	91.7	90.7	92.6	87.7	91.4	83.8	91.9	78.6
☐ Males	90.8	94.4	95.0	91.7	93.2	89.9	92.2	89.8	93.2	84.2	91.6	79.3	95.6	78.7
■ Females	90.9	94.6	94.0	90.4	91.6	89.8	91.2	91.4	92.1	90.6	91.2	86.9	89.5	78.4

Province or Territory

Source: Canadian Community Health Survey Cycle 1.1 2000

Note: Estimates for Nunavut males and females must be interpreted with caution.

(d) Community based services received

Community-based health care includes any health care received outside a hospital or a doctor's office. This can include home nursing care, home-based counselling or therapy, personal care and community walk-in clinics. Nearly 12% of Saskatchewan residents reported receiving community-based care in the previous twelve months, which is very similar to the percentage for the Canadian population. In the analysis that follows, the percentages are based on the number of people who received community-based services.

Because of the low percentage of people receiving community-based services, the sample size was too small to achieve reliable results for some age groups.

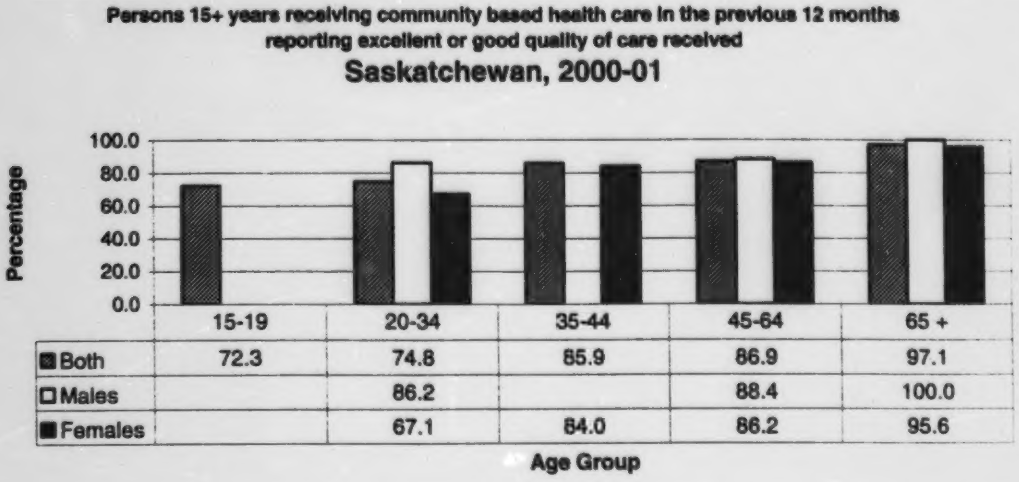
Nearly 85% of Saskatchewan residents and 77.8% of Canadian residents who received community-based health care services in the previous twelve months rated the quality of community-based health care service as excellent or very good.
Approximately 90% of Saskatchewan residents and 81.7% of Canadian residents who received community-based health care services in the previous twelve months were very or somewhat satisfied with the community-based health care services received.

Percentage of adult population who report the quality of community based health care services received in the previous 12 months as excellent or very good.

The percentage of Saskatchewan residents reporting excellent or very good quality of community-based health care is higher than the proportion of Canadians in the 35 to 44 and 65 plus age groups and in the male 65 plus age group. Otherwise, for the groups that have reportable results, Saskatchewan is about the same as the Canadian average.

In both Saskatchewan and Canada in general, the 65 plus age group has a higher percentage of respondents reporting excellent or very good quality of community-based health care than members of younger age groups.

Figure 185 Quality of Community-based Care: Saskatchewan by Age & Sex, 2000-01

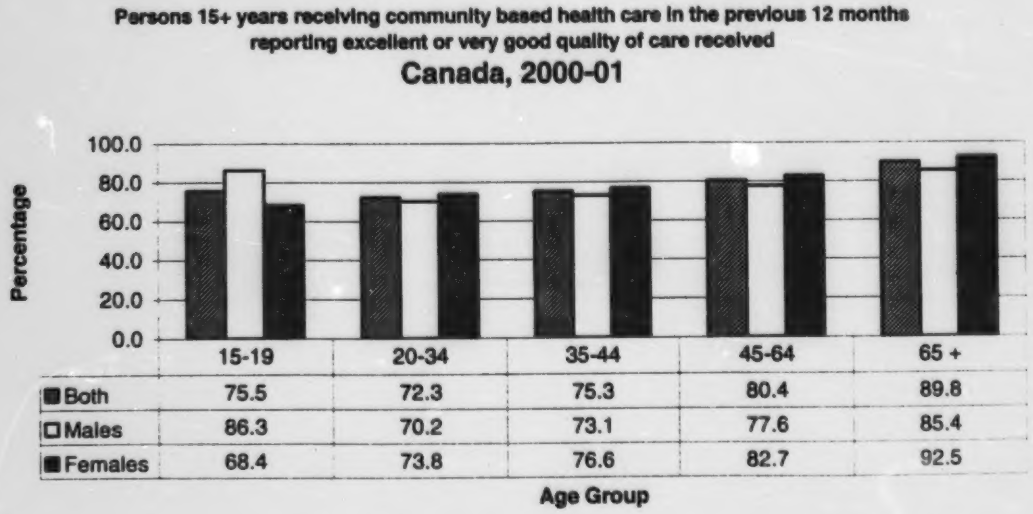


	15-19	20-34	35-44	45-64	65 +
▨ Both	72.3	74.8	85.9	86.9	97.1
☐ Males		86.2		88.4	100.0
■ Females		67.1	84.0	86.2	95.6

Source: Canadian Community Health Survey Cycle 1.1 2000

Note: The sample size is too small to report results for males and females aged 15 to 19, and males aged 35 to 44. The percentage for both males and females combined aged 15 to 19 should be viewed with caution.

Figure 186 Quality of Community-based Care: Canada by Age & Sex, 2000-01



	15-19	20-34	35-44	45-64	65 +
▨ Both	75.5	72.3	75.3	80.4	89.8
☐ Males	86.3	70.2	73.1	77.6	85.4
■ Females	68.4	73.8	76.6	82.7	92.5

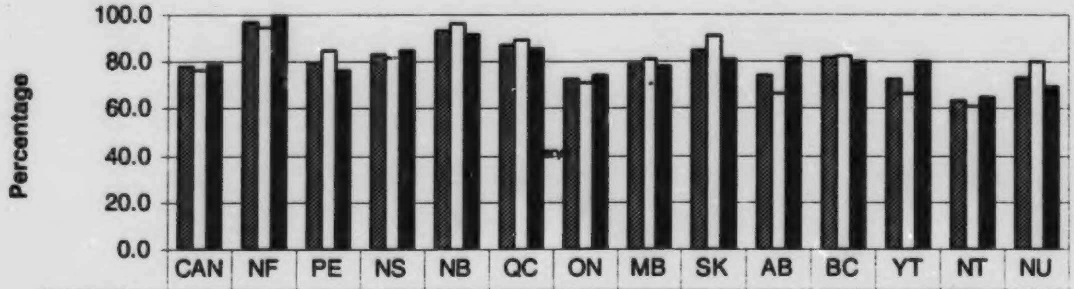
Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

The proportion Saskatchewan residents reporting excellent or very good quality community-based health care services is higher than the national average. Again, this is true of the estimates for male and female Saskatchewan residents when considered separately.

Figure 187 Quality of Community-based Care: Provincial Comparison, 2000-01

Persons 15+ years receiving community based health cares in the previous 12 months reporting excellent or very good quality of care received, 2000-01



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	77.8	97.3	79.4	83.4	93.1	86.9	72.7	78.9	84.8	73.9	81.3	72.4	63.2	73.4
☐ Males	76.3	94.5	85.0	81.6	96.1	89.4	70.7	80.8	91.2	66.4	82.4	66.5	61.3	79.8
■ Females	78.8	99.4	76.4	85.0	91.3	85.5	74.0	77.8	81.2	81.5	80.4	80.2	65.2	69.8

Province or Territory

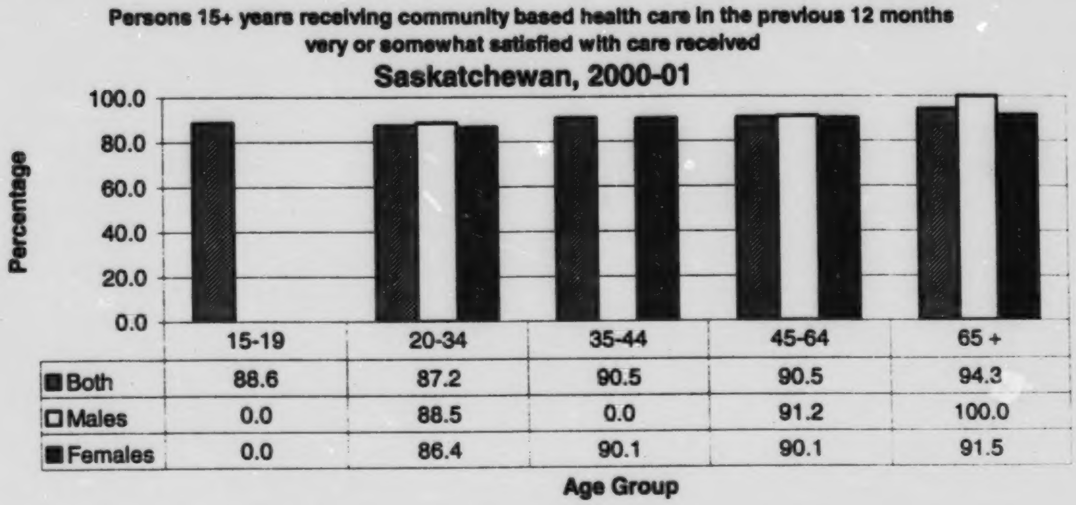
Source: Canadian Community Health Survey Cycle 1.1 2000

Note: All estimates for the Yukon, Newfoundland males, and Prince Edward Island males and females, must be interpreted with caution.

Percentage of adult population who rate themselves as very satisfied or somewhat satisfied with the way in which community based health care services received in the previous 12 months were provided.

The percentage of Saskatchewan residents reporting that they are very or somewhat satisfied with community-based health care received is higher than Canadians in the 35 to 44 age group and in the male 65 plus age group. In both Saskatchewan and Canada in general, the 65 plus age group has a higher percentage of respondents very or somewhat satisfied with community-based health care than members of younger age groups.

Figure 188 Patient Satisfaction-Community Health Care: Saskatchewan by Age & Sex, 2000-01

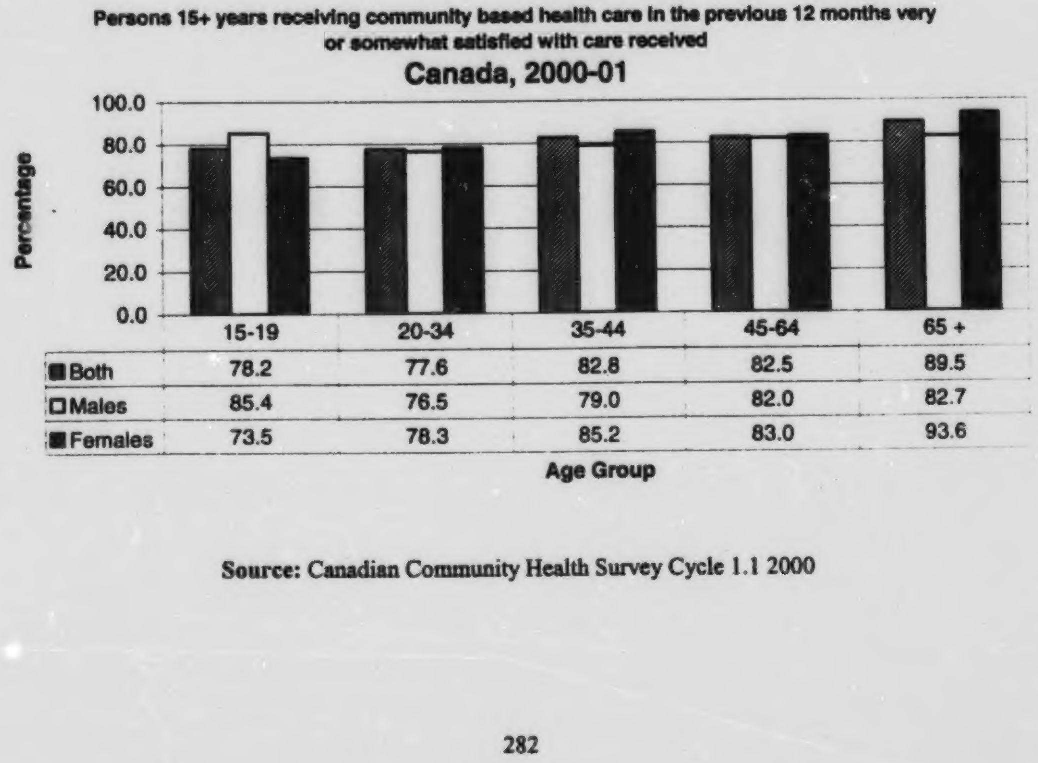


	15-19	20-34	35-44	45-64	65 +
■ Both	88.6	87.2	90.5	90.5	94.3
□ Males	0.0	88.5	0.0	91.2	100.0
■ Females	0.0	86.4	90.1	90.1	91.5

Source: Canadian Community Health Survey Cycle 1.1 2000

Note: The sample size was too small for reliable results to be reported for males and females aged 15 to 19 and males aged 35 to 44. These estimates should be interpreted with caution.

Figure 189 Patient Satisfaction-Community Health Care: Canada by Age & Sex, 2000-01



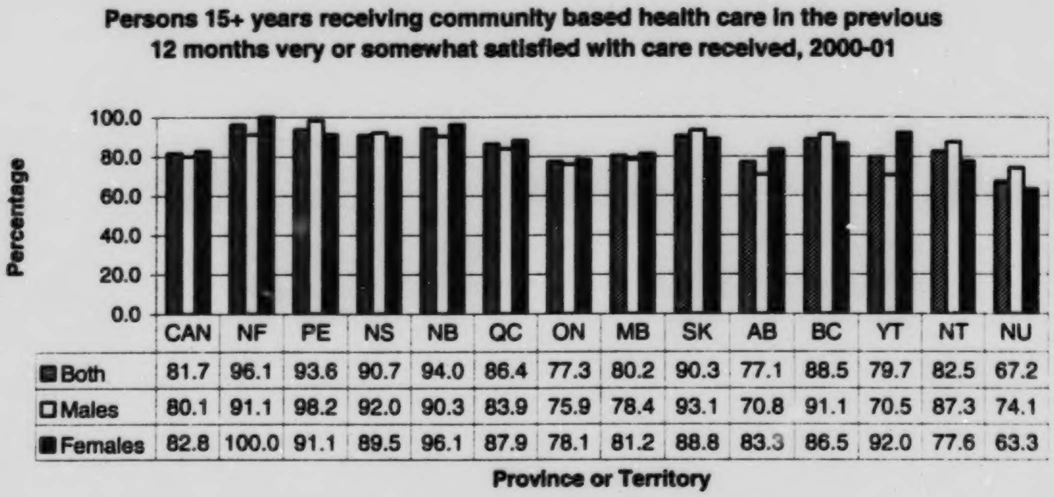
	15-19	20-34	35-44	45-64	65 +
■ Both	78.2	77.6	82.8	82.5	89.5
□ Males	85.4	76.5	79.0	82.0	82.7
■ Females	73.5	78.3	85.2	83.0	93.6

Source: Canadian Community Health Survey Cycle 1.1 2000

Provincial/Territorial Comparisons

Saskatchewan has a percentage of respondents who are very or somewhat satisfied with the way in which community-based health care services were provided that was above the national average. There is very little difference between Saskatchewan and the other provinces/territories. Percentages are again above the national average for both male and female respondents in Saskatchewan, who are very or somewhat satisfied with the community-based health care services they received.

Figure 190 Patient Satisfaction-Community Health Care: Provincial Comparison, 2000-01



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	81.7	96.1	93.6	90.7	94.0	86.4	77.3	80.2	90.3	77.1	88.5	79.7	82.5	67.2
☐ Males	80.1	91.1	98.2	92.0	90.3	83.9	75.9	78.4	93.1	70.8	91.1	70.5	87.3	74.1
■ Females	82.8	100.0	91.1	89.5	96.1	87.9	78.1	81.2	88.8	83.3	86.5	92.0	77.6	63.3

Source: Canadian Community Health Survey Cycle 1.1 2000

Note: All estimates from the Yukon, Newfoundland males, and Prince Edward Island males, must be interpreted with caution.

The analysis above shows that Saskatchewan residents appear to be as satisfied with overall health care services, services received in a hospital, services received from a family doctor or other physician and with community based services, as are residents of other provinces. In addition, Saskatchewan residents appear to rate the quality of these services as highly as do residents of any other province.

The analysis also shows that a higher proportion of older age groups rate the services to be of higher quality and seem to be more satisfied with the services. Some research (Sun, 2000) has found that younger age groups were more likely to rate services poorly, while others (Weiss, 1988) have found that socio-demographic factors including age and sex play only a minor role in explaining variation in patient satisfaction.

One could also draw from the relationship between age and satisfaction that those individuals who receive more services in a given year will rate the quality higher and will generally be more satisfied with the service (older patients will tend to use the services more often). This phenomenon is supported by research in the area. For example, Sun et al (2000) found that number of treatments in the emergency department was positively related to patient satisfaction.

The foregoing analysis also suggests that there are relatively minor sex differences in measures of satisfaction for any of the services or in the assessment of their quality.

There is a plethora of research in the area of patient satisfaction. Many studies of the determinants of patient satisfaction view the issue as complex and multi-factorial. Patient satisfaction is related to the quality or the appearance of quality of the services provided, the socio-demographic characteristics of the persons being served, the demeanour of the staff providing service, as well as the attitudes and expectations of the individuals being served.

Some of the literature from market based health systems is designed to improve the strategic stance of corporate providers of health care and to secure market share and long term viability (Andaleeb, 1998). Thus the issue is conceptualized much like "customer" satisfaction. Andaleeb (1998) writing from this perspective found five factors which determined patient satisfaction: communications with patients; competence of staff; staff demeanour; quality of the facilities; and, perceived costs. Staff demeanour and courtesy are consistently found to contribute to patient satisfaction in a hospital or clinic setting (Holland et al 1995; Hall et al 1993; Demir et al 2002).

Other interesting research findings related to self-reported health patient satisfaction include:

- Laveist et al (2000) found that the perception of racism and mistrust of the medical care system led to less satisfaction with medical care by African Americans. Sun et al (2000) found that the patient characteristics that significantly predicted lower satisfaction in an emergency department were younger age and African American ethnicity.
- Holland et al (1995) found the two strongest predictors of patient satisfaction following outpatient surgery were courtesy of the staff and clinical quality.
- Hall et al (1993) found that the four best predictors of satisfaction with hospital care in descending order were physician capabilities, staff, amenities and accessibility.
- Weiss (1988) found certain "predispositional" factors (confidence in the community's medical care system, satisfaction with life in general) are more important in predicting satisfaction with care than are socio-demographic characteristics (age, sex, race, education or income).
- Linder-Pelz (1982) found that social psychological characteristics (expectations, values, entitlement) explained only a small proportion of the variation in satisfaction. The author

found some support for the "discrepancy model" which suggests that the greater the discrepancy between perceived occurrences and expectations the lower the satisfaction level.

- Bolivar (1999) concluded that satisfaction with family physician is complex and multi-factorial and subject to constant change due to the interrelation with the social and health care environment. Bolivar found that the main determinants of satisfaction with primary care in Spain related to the model of primary care used, better knowledge of ambulatory care and better attitudes toward ambulatory care.

- Lin et al (2001) found that ambulatory visit duration meeting or exceeding patient expectations regarding time with physician are determinants of patient satisfaction.
- Boudreaux et al (2000) found that patient's perceptions of care (caring for the patient as a person, perceptions of safety, etc.) most consistently predicted satisfaction in an emergency department, rather than demographics and visit characteristics.

- Demir et al (2002) found that determinants of overall satisfaction with hospital care in Turkey related to physician, nursing, physical plant and food service. The only statistically significant patient characteristic related to patient education.

- John Sitzia (1999) conducted a research project designed to assess the reliability and validity of instruments used to assess satisfaction in a broad sample of health service user satisfaction studies and to assess the level of awareness of these issues among study authors. He found "with few exceptions, the study instruments in this sample demonstrated little evidence of reliability or validity…lack of a reliable and valid assessment instrument casts doubt on the credibility of satisfaction findings."

In summary we can conclude that an individual's perception of the quality of service and their related satisfaction with the service provided is complex. As a result, an individual's assessment of the services they receive and their own health status is dependent on the type of service received, the provider, the patient, and when services are provided. In addition, the quality of the service provided, the frequency of use, the demeanour of the provider and/or patient, the physical surroundings, and the socio-demographic characteristics of the patient can influence an individual's perception of their own health status.

The literature clearly suggests that caution should be taken when interpreting the findings of many of the studies around patient satisfaction.

While patient satisfaction is an important indicator for assessing the quality or effectiveness of health services, it has many limitations. The reasons for an individual's perception of satisfaction or dissatisfaction or quality of service are unknown and could be related to a number of complex and interrelated factors.

Saskatchewan Health is making efforts to improve the quality and effectiveness of health service. For example, the District Quality of Care Coordinator Initiative is one way in which the department responds to client concerns.

Saskatchewan is the only province to have a provincially coordinated approach to tracking and reporting on client concerns. Client feedback is essential to maintain and enhance the quality of health services provided by each district. Through the District Quality of Care Coordinator (DQCC) initiative, health districts are required to report client concern information to Saskatchewan Health annually. The purpose of this initiative is to create a more transparent, client-focused health care system. Specifically, the role of the DQCC is to:

- assist individuals and families with questions or concerns about health services in their district,
- ensure individuals are informed about their rights and options, and;
- recommend changes and improvements to enhance the quality of health services delivered in the district based on their findings and trends of concerns raised.

All health districts now have a DQCC or designated person to review concerns about the care of a client. Additionally, there is a Provincial Quality of Care Coordinator who acts as a resource to the coordinators and to assist with more in-depth reviews of concerns.

APPENDIX A: Technical Specifications

Note on Statistical Significance and Confidence Intervals

Statistical significance is not highlighted in this report. Statistical significance refers to the extent to which differences in data estimates can be attributed to real underlying phenomenon, as opposed to being due to chance alone. Statistical significance is inferred by checking to see if the confidence intervals, which reflect the uncertainty of the estimated rate around the scores, overlap.

Throughout the report care is taken to highlight high levels of sample variability and low underlying sample sizes, which limits the extent to which statistical significance can be attributed to the data, making it less comparable. If the confidence intervals do overlap, the estimates can be considered to be basically comparable. If they don't, then this is taken as evidence of statistically significant differences.

The extent of differences between groups (either comparisons on the basis of gender, or inter-provincially) was not analyzed for statistical significance in this report. The data can only be used, therefore, to indicate whether an estimate is higher or lower, and not whether estimates are statistically different from each other.

Confidence intervals are provided elsewhere, however, for several indicators from which assumptions about the likelihood of significance can be made. These confidence intervals are available on secure website from which the indicator data itself was drawn (i.e., CIHI http://secure.cihi.ca/pirc or Statistics Canada site http://www.statcan.ca/secure/82-221/).

Indicators for which confidence intervals are available on the Statistics Canada site include:

- Self-rated health
- Age-standardized five-year relative survival rate for all cancers (breast, prostrate, colorectal, and lung)
- Patient satisfaction with health care services, recent hospital care, and physician care
- Home care utilisation
- Exposure to second-hand smoke
- Youth smoking
- Physical Activity
- Body Mass Index
- Influenza Immunization 65+
- Barriers to accessing routine care, health information, and immediate medical care
- Median waiting time for specialized services: Specialist visits, non-emergency surgery, and selected diagnostic tests

Indicators for which confidence intervals are available on the CIHI site include:

- 30 day age-related mortality rate for AMI
- 30 day age-related mortality rate for Stroke
- AMI readmission rate
- Pneumonia readmission rate

Although evidence of statistical significance is useful for establishing whether real differences are present, over and above what would be expected by chance alone, it should be stressed that statistical significance is not the same as practical significance. Large sample sizes can result in every difference being statistically significant, but this does not necessarily mean that these differences are clinically meaningful and reflective of, for example, substantially better levels of care.

In other words, small changes that are statistically significant may not be of relevance to public health, whereas a finding that does not achieve statistical significance may be of public health interest. As such, statistical significance is merely a guide to interpreting research findings and is not an absolute measure of relevance with respect to public health policy and planning.

For these reasons, statistical significance (and the confidence intervals on which significance is based) is not highlighted in this report.

Technical Specifications

This section documents the requirements set by the Performance Indicators Reporting Committee (PIRC) for the jointly agreed indicators in the 14 required areas in its August 7, 2002 document. PIRC's primary role is to develop and drive the overall process to achieve agreement on comparable reporting and to make recommendations to the Conference of Deputy Ministers of Health (CDM). In addition, although each jurisdiction will prepare its own report on comparable indicators in 2002, CDM confirmed that PIRC should develop jointly agreed common guidelines for the preparation of these reports in order to improve their usefulness to the public.

Self-reported health

Definition: Percent of the population age 12+ who report that their health is very good or excellent.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 12 years of age are not surveyed.

Numerator: Estimated number of persons reporting excellent or very good health within a survey cycle for Saskatchewan (response categories are excellent, very good, good, fair, poor).

Denominator: Total population aged 12 and over in Saskatchewan.

Calculation: (numerator/denominator) x 100, with weighting adjusted to reflect non-response.

Source: Canadian Community Health Survey- Cycle 1.1 – 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

Life expectancy

Definition: The number of years a person would be expected to live, starting from birth (for life expectancy at birth) or at age 65 (for life expectancy at age 65), on the basis of the mortality statistics for a given observation period, typically a calendar year.

Calculation: Life expectancy is calculated using mortality rates with Greville's method for abridged life tables, using five-year age groupings of both population and mortality rate.

Exclusions: None

Source: Statistics Canada, Vital Statistics, Death Database and Demography Division (population estimates).

Disability-free life expectancy

Definition: Disability-free life expectancy at birth is the number of years an average individual would be expected to live, starting from birth, free of moderate or severe disability. on the basis of the mortality statistics and disability prevalence patterns by age and sex for a given observation period, typically a calendar year.

Disability-free life expectancy at age 65 is the average number of additional years a person who has reached the age of 65 would expect to live free of moderate or severe disability on the basis of the mortality statistics and disability prevalence patterns by age and sex for a given observation period, typically a calendar year.

Exclusions: Non-residents are excluded from the deaths and population estimates used for the life tables. In addition, individuals living in military bases or First Nation reserves are excluded from the NPHS and the CCHS and are thus implicitly treated as having the same average rates of disability as the rest of the population.

Source: Statistics Canada, Vital Statistics, Death Database and Demography division (population estimates), and the 1996 Census (20% sample).

Low birth weight

Definition: The proportion of live births with a birth weight greater than 500 grams and less than 2,500 grams.

Exclusions: births with unknown birth weight; births to non-residents are excluded from numerator and denominator.

Numerator: number of live births ≥ 500 and < 2500 grams within the specified year.

Denominator: total live births with known birth weight ≥ 500 grams within the specified year.

Calculation: low birth weight percentage = (numerator/denominator) x 100
-births are assigned to jurisdiction by mother's Province/Territory of residence
-no adjustment for age of mother

Source: Statistics Canada, Vital Statistics, Birth database.

Infant mortality

Definition: The number of infants who die in the first year of life, expressed as a rate (per 1,000 live births) for that year.

Exclusions: Births to non-resident mothers, and infant deaths to non-residents. For example, Hull, Quebec babies who die in a hospital in Ontario are not counted in the infant mortality rates for Ontario.

Numerator: number of deaths (excluding estimated number weighing less than 500 grams at birth) at less than one year of age, in a given year.

Denominator: total live births weighing at least 500 grams in a given year

Calculation: number of deaths divided by total live births x 1,000

Source: Statistics Canada Catalogue 84F0210XPB, Births and Deaths and Statistics Canada web site.

Physical activity

Definition: (a) Population aged 12 and over who report a physical activity index of "active".
(b) Population aged 12 and over who report a physical activity index of "inactive".

The physical activity index is based on an individual's energy expenditure (EE). Energy expenditure is calculated using the frequency and duration per session of physical activity, as well as the MET (metabolic) value. The MET is the energy cost of the activity expressed as kilocalories expended per kilogram of body weight per hour of activity, doing a physical activity during the past three months, the number of times and time spent on each activity.

A physical activity index is calculated to determine energy expenditure values (EE). The derived physical activity index results in the following categories:

- Active: Average 3.0+kcal/kg/day of energy, or exercise required for cardiovascular health benefit.
- Moderate: Average 1.5 to 2.9 kcal/kg/day. Some health benefits but little cardiovascular.
- Inactive: Energy expenditure below 1.5 kcal/kg/day.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons under 12 years of age.
Numerator: a) Numerator of individuals reporting an active level of physical activity (combining moderate and active physical activity index categories).
b) Numerator of individuals reporting an inactive level of physical activity.
Denominator: Total Canadian population aged 12 and over.
Calculation: (numerator/denominator) x 100.
Source: Canadian Community Health Survey - Cycle 1.1 2000.

Youth Smoking

The data are based on the question: At the present time do you smoke cigarettes daily, occasionally or not at all? This indicator is usually reported as the proportion of current smokers by age groups and sex.

Definitions: Population aged 12 to 19 reporting they are current smokers, at the time of the interview.
Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons 20 years

and older and persons younger than 12 years of age.
Numerator: weighted number of individuals aged 12-19 who report currently smoking.
Denominator: total Canadian population aged 12 - 19.
Calculation: (numerator/denominator) x 100, with weighting adjusted to reflect non-response.
Source: Canadian Community Health Survey

Exposure to environmental tobacco smoke

Definitions: Proportion of the non-smoking Canadian population regularly exposed to environmental smoke.
Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 12 years of age are not surveyed.
Numerator: Total number of non-smoking persons reporting exposure to environmental tobacco smoke in Canada.
Denominator: Total population.
Calculation: Numerator/Denominator x 100.
Source: Canadian Community Health Survey.

Body weight

Definition: Per cent of adults who report a body mass index in specified categories. These categories (BMI-International standard) include: under 18.5 (underweight), 18.5-24.9 (acceptable weight), 25.0-29.9 (overweight) and 30.0 or higher (obese).

Body mass index is based on self-reported height and weight, and calculated for persons 20 to 64 years old, excluding pregnant women. BMI is calculated as weight (in kilograms) divided by height (in metres) squared.
Exclusions: Individuals less than 20 years of age as well as survey frame exclusions (see Physical Activity).
Numerators: number of Canadians aged 20 to 64, reporting a BMI in each of the four categories shown under requirements below
Denominator: total Canadian population aged 20 to 64
Calculation: (numerator/denominator) x 100
Source: Canadian Community Health Survey – Cycle 1.1, 2000; National Population Health Survey, 1994, 1996, 1998; ISQ

Chlamydia

Exclusions: None
Numerator: Reported cases of genital Chlamydia infection
Denominator: Total population by age group
Calculation: Numerator/denominator x 100,000

Source: Division of Sexual Health Promotion and STD Prevention & Control, Bureau of HIV/AIDS, STD & TB, Health Canada, 2001

Notes: Provinces/territories update their reportable disease data frequently, even after Health Canada finalizes the data for a given period, so provinces/territories always have the most up-to-date data for their respective jurisdictions.

- The introduction of non-invasive and more sensitive tests for chlamydia can increase the reported rate in a jurisdiction; timing of the implementation of such tests should be noted.
- This data captures only reported cases.
- Approximately three quarters of female infections are asymptomatic and about half of male infections are asymptomatic and many remain undiagnosed.
- The data for year 2000 are preliminary (last updated November 2001) and changes are anticipated.
- The rates and number of cases for males and females combined include cases not specified for sex.

HIV

Definition: Estimates of new diagnoses of HIV infection, based on new positive HIV test reports
Exclusions: None
Numerator: Number of newly diagnosed cases of HIV infection
Denominator: Total population
Calculation: Numerator/denominator x 100,000
Source: Communicable Disease reports. Health Canada. HIV and AIDS in Canada: Surveillance Report to Dec 31, 2001. Division of HIV/AIDS Epidemiology and Surveillance

Potential years of life lost due to unintentional injury

Definitions: Potential years of life lost (PYLL) is the number of years of life "lost" when a person dies "prematurely" from any cause – defined as dying before age 75. A person dying at age 25, for example, has lost 50 years of life.

PYLL can also be estimated for a specific cause, for example, the number of years of life "lost" when the person dies prematurely from a primarily preventable cause such unintentional injury. Rates are presented as deaths from unintentional injury for every 100,000 population. High PYLL rates reflect a high incidence of premature mortality; conversely, low PYLL rates indicate a low degree of premature mortality.

Unintentional ("accidental") injuries includes injuries due to causes such as motor vehicle collisions, falls, drowning, burns, and poisoning, but not medical misadventures/complications (ICD-9 E800-E929, excluding E870-E879).

Exclusions: None

Numerator: Deaths of persons under exact age 75, by age group, sex and cause. Take the midpoint in each group, subtract from 75 and multiply the number of deaths in that age group disaggregated by sex and cause of death. This represents PYLL.

Denominator: Population estimate (only if rate is desired; otherwise no denominator)

Calculation: Crude cause-specific PYLL rate per 100,000 = sum of all deaths in each age group due to specific cause X yrs lost X 100,000 / estimated population

Source: Statistics Canada, Vital Statistics, Death Database, and Demography Division (population estimates)

Potential years of life lost due to suicide.

Definition: Potential years of life lost (PYLL) is the number of years of life "lost" when a person dies "prematurely" from any cause – defined as dying before age 75. A person dying at age 25, for example, has lost 50 years of life.

PYLL can also be estimated for a specific cause, for example, the number of years of life "lost" when the person dies prematurely from a primarily preventable cause such as suicide. Rates are presented as deaths from suicide for every 100,000 population. High PYLL rates reflect a high incidence of premature mortality; conversely, low PYLL rates indicate a low degree of premature mortality.

Classification of suicide is based on the World Health Organization's, Interntional Classification of Diseases, 9th Revision (ICD-9) coding scheme (E950-E959)

Exclusions: None

Numerator: Deaths of persons under exact age 75, by age group, sex and cause. Take the midpoint in each group, subtract from 75 and multiply the number of deaths in that age group disaggregated by sex and cause of death. This represents PYLL.

Denominator: Population estimate (only if rate is desired; otherwise no denominator)

Calculation: Crude cause-specific PYLL rate per 100,000 = sum of all deaths in each age group due to specific cause X yrs lost X 100,000 / estimated population

Source: Statistics Canada, Vital Statistics, Demography Division (population estimates); ISQ

Measles

Definition: The rate of new cases of measles reported by year.
Numerator: Total number of cases in Canada.
Denominator: Total population
Exclusions: None
Calculation: Numerator/denominator x 100,000
Source: Provinces and territories
Notifiable Disease Reporting System (1980 to 1997)
Enhanced Surveillance System (1998 to 2001)

Haemophilus Influenzae b (Hib)

Definition: The rate of new cases reported by year in children under 5.
A confirmed case is defined as invasive disease with laboratory confirmation of infection in the absence of recent immunization with Hib-containing vaccine: isolation of H. influenzae type b from a normally sterile site or epiglottis in a person with epiglottitis, or demonstration of H. influenzae type b antigen in cerebrospinal fluid. Invasive disease includes meningitis, bacteraemia, epiglottitis, pneumonia, pericarditis, septic arthritis, or empyema.
Numerator: Number of cases in children < 5 years of age.
Denominator Number of children < 5 years
Exclusions: None
Calculation: Numerator/denominator x 100, 000
Source: Notifiable disease reporting and enhanced surveillance system

Invasive meningococcal

Definition: The rate of new cases reported by year, age and serogroup.
A confirmed case is defined as invasive disease with laboratory confirmation of infection: isolation of *Neisseria meningitidis* from a normally sterile site (blood, cerebrospinal fluid, joint, pleural or pericardial fluid) or demonstration of *N. meningitidis* antigen in cerebrospinal fluid.
Numerator: Total number of cases
Denominator: Total population under 20 years of age.
Exclusions: None.
Calculation: Numerator/denominator x 100, 000.
Source: Provincial and Territorial Ministries of Health.

Tuberculosis

Definition: rate of tuberculosis cases of infectious pulmonary tuberculosis reported by calendar year.
Cases with mycobacterium complex (i.e. *M. tuberculosis, M. bovis*, excluding BCG strain or *M. africanum*) demonstrated on culture in the absence of

bacteriological proof, cases clinically compatible with active tuberculosis that have, for example:

- Chest x-ray changes compatible with active tuberculosis including idiopathic pleurisy with infusion
- Active extrapulmonary tuberculosis (meningeal, bone, kidney, peripheral lymph nodes, etc.)
- Pathologic or post-mortem evidence of active tuberculosis.

Exclusions: None
Numerator: Number of reported cases of new active and relapsed tuberculosis
Denominator: Total population
Calculation: Numerator/denominator x 100,000
Source: Canadian Tuberculosis Reporting System (CTBRS)

Influenza for 65+

Definition: Population over 65 who report having a flu shot in the past year
Exclusions: survey frame exclusions. Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 12 years of age are not surveyed.
Numerator: estimated population 65+ reporting immunization.
Denominator: total Canadian population aged 65+.
Calculation: (numerator/denominator) x 100
Source: Canadian Community Health Survey (sub sample)– Cycle 1.1, 2000; ISQ.
Note: This indicator is usually reported as the proportion of individuals reporting immunization within certain time frames. The questions asked are: Have you ever had a flu shot? When did you have your last flu shot?

E.coli

Definition: Rate of e.coli cases reported by year.
Exclusions: none
Numerator: number of reported cases of Verotoxogenic *E. coli*
Denominator: total population
Calculation: numerator/denominator x 100,000
Source: Notifiable Disease records

AMI Mortality Rate

Definition: The number of deaths of individuals where the underlying cause of death is acute myocardial infarction, per 100,000 population, that would have occurred in the standard population if the actual age-specific rates observed in a given population had occurred in the standard population.
Exclusions: Deaths of non-residents of Canada
Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Stroke mortality rate

Definition: The number of deaths of individuals where the underlying cause of death is cerebrovascular disease (stroke), per 100,000 population, that would have occurred in the standard population if the actual age-specific rates observed in a given population had occurred in the standard population.
Exclusions: Deaths of non-residents of Canada
Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

30-day in-hospital stroke

Definition: The risk adjusted rate of all cause in-hospital death occurring within 30 days of admission to an acute care hospital with a diagnosis of stroke.
Limitation: rates not adjusted for patient acuity.
Exclusions: Patients under 20 and over 105 years of age
Numerator: The number of deaths from all causes that occur in-hospital within 30 days of first admission for stroke who satisfy the conditions listed for the denominator.
Denominator: Number of patients with a diagnosis of stroke admitted to acute care hospitals in the defined time period, who have no previous admission(s) to an acute care hospital for stroke in the year prior to the index admission.
Source: Hospital Morbidity Database, CIHI

30-day in-hospital acute myocardial infraction

Definition: The risk adjusted rate of all cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of Acute Myocardial Infarction.
Exclusions: patients less than 20 years of age or greater than 105 years of age; patients discharged alive with a total length of stay less than 3 days; transfers from another acute care facility; records where AMI is coded as a complication; records containing an invalid Health Card number; records which are out of jurisdiction
Numerator: number of deaths from all causes that occur in-hospital within 30 days of first admission for an AMI among patients who meet the conditions specified for the denominator
Denominator: number of patients who were admitted to an acute care hospital in a given period with a most responsible diagnosis of AMI and who had not been admitted to an acute care hospital with the same most responsible diagnosis within one year prior to the index admission
Source: Hospital Morbidity Database, CIHI

Incidence rates for breast, prostate, colorectal and lung cancer

Definition: The number of newly diagnosed primary cancer cases in a given year for specific sites per 100,000 that would have occurred in the standard population if the actual age-specific rates observed in a given population had occurred in the standard population.

Exclusions: Non-residents of Canada

Source: Statistics Canada, Canadian Cancer Registry, and Demography Division (census population estimates); ISQ

Potential years of life lost for breast, prostate, colorectal and lung cancer, as well as AMI and stroke

Definition: Potential years of life lost (PYLL) is the number of years of life "lost" when a person dies "prematurely" from any cause – defined as dying before age 75. A person dying at age 25, for example, has lost 50 potential years of life.

PYLLs can also be estimated for a specific cause, in which case the indicator measures the number of years of life "lost" when a person dies before age 75 due to a cause like injury, cancer, AMI or stroke.

Exclusions: Non-residents of Canada are excluded from the deaths and population estimates used in the numerator and denominator.

Numerator: Deaths of persons under exact age 75, by age group, sex and cause. Take the midpoint in each age group, subtract from 75 and multiply the number of deaths in that age group disaggregated by sex and cause of death. This represents PYLL.

Denominator: Population estimate (only if a rate is desired; otherwise, no denominator)

Source: Statistics Canada, Vital Statistics, Death Data Base and Demography Division (population estimates); ISQ

Note: In the 1970s and 1980s, Canada PYLL was based on age<70. Other cutoffs have been used by different countries and at different points in time. Any work done now on PYLL based on <age 75 will differ from published data on PYLL from most previous Canadian sources and should not be compared with each other. The choice of age 70 or 75 is arbitrary, and does not greatly affect time trends or inter-provincial comparisons.

Mortality rates for breast, prostate, colorectal and lung cancer

Definition: The number of deaths of individuals where the underlying cause of death is one of those specified, per 100,000 population, that would have occurred in the standard population if the actual age-specific rates observed in a given population had occurred in the standard population.

Exclusions: Deaths of non-residents of Canada

Source: Statistics Canada, Vital Statistics, and Demography Division; ISQ

Note: From 1979 to 1999, the underlying cause of death was coded using ICD-9; beginning with 2000, the underlying cause of death will be coded using ICD-10, thus introducing discontinuity to the trend data.

Relative survival rates for breast, prostate, colorectal and lung cancer

Definition: The ratio of the observed survival in the group of cancer patients under study five years after diagnosis and the survival that would have been expected had they been subject only to the mortality rates of the general population similar in characteristics such as age, sex, and geographic place of residence.

Exclusions: Restricted to cases diagnosed in 1992 that were the first primary cancer for the individual. Subjects with an unknown year of birth or death; subjects younger than 15 or older than 99 years of age at diagnosis; subjects diagnosed through autopsy or death certificate only

Source: Statistics Canada, Canadian Cancer Registry, Canadian National Mortality Data Base, and Canadian and provincial life tables (1990-1992); ISQ

Hip and knee replacement rates

Definition: age standardized rate of total unilateral or bilateral hip replacement surgery performed on in-patients in acute care hospitals.

Procedure Code(s): ***For Hip:*** CCP code of 93.51 or 93.59 or ICD-9-CM code of 81.51 or 81.53 in any procedure field

For Knee: CCP code of 93.41 or ICD-9-CM code of 81.54 or 81.55 in any procedure field.

Calculation(s): Standardized rates are age adjusted using a direct method of standardization based on the July 1st, 1991 Canadian population as follows:

Age	Pop.	Age	Pop.
<1	403,061	45-49	1,674,153
1-4	1,550,285	50-54	1,339,902
5-9	1,953,045	55-59	1,238,441
10-14	1,913,115	60-64	1,190,217
15-19	1,926,090	65-69	1,084,588
20-24	2,109,452	70-74	834,024
25-29	2,529,239	75-79	622,221
30-34	2,598,289	80-84	382,303
35-39	2,344,872	85-89	192,410
40-44	2,138,891	90+	95,467

Exclusions: Patients not treated as inpatients in acute care hospitals and those who received their surgery prior to admission.

Numerator: number in-patient separations from acute care hospitals (discharges, sign-outs, and deaths) where the patient received a total hip replacement during the year, by age and gender categories.
Denominator: population by age and gender categories, either from census or census estimates, for the year.
Sources: Hospital Morbidity Database, CIHI. Canada Census, Statistics Canada; ISQ.

Home care Admissions

Definition: The number of admissions to publicly funded home care services, including home health and home support services, per capita

Home care services: A range of health-related, social and support services received at home with costs being entirely or partially covered by a national/provincial/territorial health plan. These services enable clients incapacitated, in whole or in part, to live in their home environment. These services help individuals achieve and maintain optimal health, well-being and functional ability through a process of assessment, case co-ordination, and/or the provision of services. Service recipients may have one or more chronic health conditions or recently experienced an acute episode of illness or hospitalization. The range of services provided includes maintenance, rehabilitation, long-term supportive care, acute care substitution, end-of-life care and support for informal caregivers.
Home health care: Includes information and referral, assessment and case management services, nursing services and therapy services.
Home support: Includes homemaking services, personal care or assistance with daily living, meal provision, and home maintenance, home adaptation, transportation, respite and volunteer services.
Admissions to home care services: Individuals are to be counted when they are accepted into the home care program within the fiscal year of interest. Acceptance is defined as: a) acknowledgement by the home care program that the individual qualifies for service (based on assessed needs and program criteria); and b) agreement between the program and the individual (or caregiver) to begin service delivery.

Exclusions: None (administrative data do not allow for exclusion of out-of-province clients)
Numerator: Total number of admissions to home care services (health, social and support services) during the fiscal year
Denominator: Total provincial/territorial population from census or census estimates
Calculations: Total admissions to home care services ÷ total provincial/territorial population
Source: Ad hoc survey of provincial and territorial ministries; census

Home care admissions, age 75+

Definition: The number of admissions to home care services, age 75+ (receiving publicly funded home care services, including home health care and home support services) per capita.

Service definitions: (see Home care Admissions)

Exclusions: None (administrative data do not allow for exclusion of out of province patients)
Numerator: Total number of admissions age 75+ to home care services (health care and home support) during the fiscal year
Denominator: Total provincial population age 75+ from census or census estimates
Calculations: Total admissions 75+/Total population age 75+
Source: Jurisdictions; census (Statistics Canada); ISQ

Access to Services: Wait Time for Cardiac Surgery

Definition: Jurisdictions will report, to the extent possible, on: the number of months to clear the current wait list for CABG; the median wait in days for CABG surgery and, the distribution of CABG wait times.

(i). Estimated number of months to clear current wait list for CABG

Numerator: Total # of adults (aged 20 and over) who have received cardiac catheterization and been designated by a physician as needing CABG surgery, but have not yet received their surgery on the last day of the period in question.
Denominator: The average number of CABGs completed per month within the specified period.

- Include only "isolated" CABG cases, uncomplicated by any other procedure (e.g. valve repair or replacement)
- Because of differences in urgency rating processes across the country, include all emergent and non-emergent CABG cases. If only non-emergent cases are tracked, report the percent of total CABG cases that they represent in the period in question in addition to the indicator
- Report data for patients resident in the jurisdiction, regardless of where surgery occurs. If non-residents cannot be separated, report the percent of total CABG cases that they represent in the period in question in addition to the indicator
- Where possible, individuals should not be counted in the numerator if a decision has been made, either by the individual or his/her physician, not to proceed with surgery or to delay surgery for medical or other reasons

(iii) Distribution of wait times

Definition: Percent of adults (aged 20 and older) who received CABG surgery in the period in question and who waited ≤14 days, 15-42 days, 43-180 days, >180 days, between cardiac catheterization and CABG surgery.

- Include only "isolated" CABG cases, uncomplicated by any other procedure (e.g. valve repair or replacement)
- Because of differences in urgency rating processes across the country, include all emergent and non-emergent CABG cases. If only non-emergent cases are tracked, report the percent of total CABG cases that they represent in the period in question in addition to the indicator
- Report data for patients resident in the jurisdiction, regardless of where surgery occurs. If non-residents cannot be separated, report the percent of total CABG cases that they represent in the period in question in addition to the indicator
- Where possible, an individual should not be counted if a decision has been made, either by the individual or by his/her physician, not to proceed with surgery or to delay surgery for medical or other reasons

Access to Services: Wait Time for Hip & Knee Replacement

Definition: Jurisdictions will report, to the extent possible, on the following indicators: number of months to clear the current wait lists for total hip and total knee replacement surgery; median wait in weeks for total hip and total knee replacement surgery and, distribution of wait times for total hip and total knee replacement surgery.

(i). Months to clear wait list

Definition: Estimated number of months to clear current wait list for (a) total hip replacement surgery and (b) total knee replacement surgery

Numerator: Total number of adults (aged 18 and older) who have been referred for hip/knee replacement surgery but have not yet received it on the last day of the period in question.

Denominator: The average number of adults (aged 18 and older) who have had total hip/ knee replacement surgeries performed per month within the specified period.

- Include only new total hip or total knee replacement procedures (i.e. excluding revisions and partial replacements)
- Include all elective and non-elective cases. If only non-elective cases are tracked, report the percent of total surgeries that they represent in the period in question in addition to the indicator
- Report data for patients resident in the jurisdiction, regardless of where surgery occurs. If non-residents cannot be separated, report the percent of total hip/knee cases that they represent in the period in question in addition to the indicator

- Where possible, individuals should not be counted in the numerator if a decision has been made, either by the individual or his/her physician, not to proceed with surgery or to delay surgery for medical or other reasons

(ii). Median wait

Definition: Median number of weeks waited between the date the surgeon made a decision, with the patient's agreement, that surgery was required and the date that surgery was performed for adults (aged 18 and over) who received surgery in the period in question.

- Include only new total hip or total knee replacement procedures (i.e., exclude revisions and partial replacements)
- Include all elective and non-elective cases. If only non-elective cases are tracked, report the percent of total surgeries that they represent in the period in question in addition to the indicator
- Report data for patients resident in the jurisdiction, regardless of where surgery occurs. If non-residents cannot be separated, report the percent of total hip/knee cases that they represent in the period in question in addition to the indicator
- Where possible, individuals should not be counted if a decision has been made, either by the individual or his/her physician, not to proceed with surgery or to delay surgery for medical or other reasons

(iii). Distribution of wait times

Definition: Percent of adults (aged 18 and older) who received total hip or total knee replacement surgery in the period in question who waited <3 months, 3-6 months, 7-12 months, 13-18 months, or >18 months from when the surgeon made a decision, with the patient's agreement, that surgery was required to when the surgery was performed.

- Include only new total hip or total knee replacement procedures (i.e. excluding revisions and partial replacements)
- Include all elective and non-elective cases. If only non-elective cases are tracked, report the percent of total surgeries that they represent in the period in question in addition to the indicator
- Report data for patients resident in the jurisdiction, regardless of where surgery occurs. If non-residents cannot be separated, report the percent of total hip/knee cases that they represent in the period in question in addition to the indicator
- Where possible, individuals should not be counted if a decision has been made, either by the individual or his/her physician, not to proceed with surgery or to delay surgery for medical or other reasons

Reported median wait time for (a) specialist physician visits, (b) diagnostic services, and (c) surgery.

Definition: Wait time refers to the length of time, in weeks, between the patient being referred for a specialized service and receiving the service, during the 12 months prior to the survey.

The median is the 50th percentile of the distribution of wait times: half the patients wait less and half wait longer than the median number of weeks. Patients who have not yet received the service are excluded from the indicator calculation.

Note: specialist physician visits include visits for a new illness or condition only; diagnostic tests include non-emergency MRIs, CT Scans and angiographies only; surgery includes only non-emergency cases.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 15 years of age; persons who did not agree to share his/her CCHS survey responses with participating jurisdictions.

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

8d(ii). Distribution of reported wait times

Distribution of reported wait times for (a) specialist physician visits, (b) diagnostic services, and (c) surgery.

Definition: Wait time refers to the length of time, in weeks, between the patient being referred for a specialized service and receiving the service.

The indicator is the percent of those requiring a specialized health service that waited less than 1 month, between 2 to 3 months or more than 3 months to receive the service, during the 12 months prior to the survey. Patients who have not yet received the service are excluded from the indicator calculation.

Note: Jurisdictions may also choose to report on the total number of persons who were waiting, expressed as an age-standardized rate per 1,000 population, as of November 2001.The per capita rate indicates the total size of the waiting list as well as the rate per capita of those who waited in each of the three wait time categories.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 15 years of age; persons who did not agree to share his/her CCHS survey responses with participating jurisdictions.

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

Access to Services: 24/7 First Contact Health Services

(i) Access to routine or on-going health services

Definition: Percent who required routine or on-going health services for self or a family member in the past 12 months and experienced difficulties obtaining them (a) during regular daytime hours and (b) during evenings or weekends.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less 15 years of age; persons who did not agree to share his/her CCHS survey responses with participating jurisdictions.

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

(ii) *Difficulty obtaining health information or advice*

Definition: Percent who required health information or advice for self or a family member in the past 12 months and experienced difficulty obtaining it (a) during regular daytime hours (b) during evenings or weekends, and (c) at night.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 15 years of age; persons who did not agree to share his/her CCHS survey responses with participating jurisdictions.

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

(iii) *Difficulty obtaining immediate care*

Definition: Percent who required immediate care for a minor health problem for self or a family member in the past 12 months and experienced difficulty obtaining it (a) during regular daytime hours (b) during evenings or weekends and (c) at night.

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than

15 years of age; persons who did not agree to share his/her CCHS survey responses with participating jurisdictions.

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

(iii) *Percent of population having a regular family doctor*

Definition: Percent of total survey respondents who say "yes" to the question: "Do you have a regular family doctor?"

Exclusions: Persons living on First Nation Reserves and on Crown lands, residents of institutions, full-time member of Canadian Armed Forces and residents of certain remote regions are excluded from the sample. Persons less than 15 years of age; persons who did not agree to share his/her CCHS survey responses with participating jurisdictions.

Source: Canadian Community Health Survey – Cycle 1.1 – 2000/2001; Health Services Access Survey (supplement to CCHS) – Nov-Dec 2001.

Readmission for Pneumonia

Definition: Risk adjusted rate of unplanned readmission following admission for Pneumonia (ICD-9 481, 482, 485, 486). A case is counted as a readmission if it is for a relevant diagnosis or procedure and occurs within 28 days after the index episode of care. An episode of care refers to all continuous acute care hospitalizations including transfers. For example, if an individual was hospitalized for pneumonia, admitted to Hospital X, transferred to Hospital Y, and later transferred to Hospital Z, this would be counted as one episode, but three hospitalizations.

Numerator: Number of in-patient acute care pneumonia episodes with a readmission during the year

Denominator: Total number of acute care pneumonia episodes during the year

Source: Hospital Morbidity Database, CIHI
Discharge Abstract Database, CIHI

Availability: 1997-98 to 1999-00

Comprehensiveness: Rates for Québec and Manitoba are forthcoming. Rates for the three territories are suppressed due to small numbers.

Unit of Analysis: The unit of analysis is an "Episode of care". An episode of care refers to all contiguous in-patient hospitalizations and same-day surgery visits. To construct an episode of care, a transfer is assumed to have occurred if either of the following conditions is met:

- Admission to an acute care institution or same day surgery facility occurs within 6 hours of discharge from another acute care institution or same day surgery facility regardless of whether the transfer is coded by either institution;

- Admission to an acute care institution or same day surgery facility occurs within 6-12 hours of discharge from another acute care institution or same day surgery facility and at least one of the institutions has coded the transfer.

Comments:
The ability to link same day surgery visits to in-hospital admissions was possible for those provinces submitting day surgery data to the Discharge Abstract Database. Due to the unique characteristics of the database extraction of cases for Quebec and parts of Manitoba, a slightly different approach than that described here was required. Details available upon request.

The rates are based on the province of residence rather than the province of hospitalization.

Calculation(s): A logistic regression model is fitted with age, gender, and select comorbid conditions as independent variables. Coefficients derived from the logistic model are used to calculate the probability of readmission for each case (i.e., index episode). The expected readmission rate of a province is the sum of these case probabilities divided by the total number of cases. The risk adjusted readmission rate (RARR) is calculated by dividing the observed readmission rate of each province by the expected readmission rate of the province and multiplying by the average readmission rate. A 95 percent confidence interval for the RARR is also calculated.

Denominator (Index Episode)
Inclusion Criteria:

1. Most responsible (Type M) diagnosis of Pneumonia (ICD-9 481, 482, 485, 486) that is not also a Type 2 diagnosis (post-admit comorbidity)

OR

Where another diagnosis has been coded as the most responsible and also a Type 2, and a diagnosis of Pneumonia, although not the most responsible, is coded as a Type 1 (pre-admit comorbidity)

2. Discharge between April 1, and March 3 of the following year (period of case selection ends March 1 to allow for 28 days of follow-up)
3. Age at admission between 15 and 84 years
4. Gender recorded as male or female
5. Admission to an acute care institution

Exclusion Criteria:

6. Records with an invalid Health Card Number
7. Discharged as a death or self sign-out
8. Any one of the following ICD-9 diagnoses recorded in any position:

- Cancer (140-172, 174-208, V58.1, V58.0)
- HIV (042, 043, 044, V08)
- Trauma (E800-E848, E881-E884.1, E884.9, E886.0, E890-E899, E900-E910, E913-E926, E928, E950-E968, E970-E976, E990-E998)

Numerator:
The numerator is a subset of the denominator meeting the following conditions:

1. Readmission within 28 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital
3. Readmission for any one of the following conditions (ICD-9):

- Pneumococcal pneumonia (481)
- Other bacterial pneumonia (482)
- Bronchopneumonia, organism unspecified (485)
- Pneumonia, organism unspecified (486)
- Other specified bacteria (008.4)
- Staphylococcal septicemia (038.1)
- Empyema (510)
- Unspecified pleural effusion (511.9)
- Urinary tract infection, site not specified (599.0)

References:

Brown AD, Anderson GM. *Methods for measuring clinical utilization and outcomes*. In Baker GR, Anderson GM, Brown AD et al (eds.) *The Hospital Report '99*. Health Care Performance Measurement Group, University of Toronto, Toronto, 1999.

Dönges K, Schiele R, Gitt A, Wienbergen H, Schneider S, Zahn R, Grube R, Baumgärtel B, Glunz HG, Senges J. *Incidence, Determinants, and Clinical course of Re-infarction in-hospital after Index AMI.* Am J Cardiol 2001; 87:1039-1044.

Heller RF, Fisher JD, D'Estr CA, Lim LL-Y, Dobson AJ, Porter R. *Death and Readmission in the year after hospital admission with cardiovascular disease: the Hunter Area Heart and Stroke Register*. MJA 2000; 172:261-265.

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Hospital Report Acute Care 2001. Technical notes, Clinical Utilization and Outcomes. Canadian Institute for Health Information and the University of Toronto. A joint initiative of the Ontario Hospital Association and the Government of Ontario, 2001.

Maynard C, Every NA, Weaver WD. *Factors associated with re-hospitalization in patients with acute myocardial infarction*. Am J Cardiol 1997; 80:777-779

Readmission for AMI

Definition: Risk adjusted rate of unplanned readmission following admission for acute myocardial infarction (AMI). A case is counted as a readmission if it is for a relevant diagnosis or procedure and occurs within 28 days after the index AMI episode of care. An episode of care refers to all continuous acute care hospitalizations including transfers. For example, if an individual was hospitalized for an AMI, admitted to Hospital X, transferred to Hospital Y, and later transferred to Hospital Z, this would be counted as one episode, but three hospitalizations.

Numerator: Number of acute care in-patient AMI episodes with a readmission during the year
Denominator: Total number of acute care AMI episodes in an 11-month period
Data Source: Hospital Morbidity Database, CIHI
Discharge Abstract Database, CIHI
Availability: 1997-98 to 1999-00

Comprehensiveness: Rates for Newfoundland are not available due to differences in coding of AMI admissions. Rates for Québec and Manitoba are forthcoming. Rates for the three territories are suppressed due to small numbers.

Unit of Analysis: The unit of analysis is an "Episode of care". An episode of care refers to all contiguous in-patient hospitalizations and same-day surgery visits. To construct an episode of care a transfer is assumed to have occurred if either of the following conditions is met:

- Admission to an acute care institution or same day surgery facility occurs within 6 hours of discharge from another acute care institution or same day surgery facility regardless of whether the transfer is coded by either institution;
- Admission to an acute care institution or same day surgery facility occurs within 6-12 hours of discharge from another acute care institution or same day surgery facility and at least one of the institutions has coded the transfer.

Comments:
The ability to link same day surgery visits to in-hospital admissions was possible for those provinces submitting day surgery data to the Discharge Abstract Database. Due to the unique characteristics of the database extraction, cases for Quebec and parts of Manitoba required a slightly different approach than that described here.

The rates are based on the province of residence rather than the province of hospitalization.

Calculation(s): A logistic regression model is fitted with age, gender, and select comorbid conditions as independent variables. Coefficients derived from the logistic model are used to calculate the probability of readmission for each case (i.e., index episode). The expected readmission rate of a province is the sum of these case probabilities divided by the total number of cases. The risk adjusted readmission rate (RARR) is calculated by dividing the observed readmission rate of each province by the expected readmission rate of the province and multiplying by the average readmission rate. A 95 percent confidence interval for the RARR is also calculated.

Denominator (Index Episode)
Inclusion Criteria:

1. Most responsible (Type M) diagnosis of Acute Myocardial Infarction (ICD-9 410 or ICD-9-CM 410) that is not also a Type 2 diagnosis (post-admit comorbidity)
   OR

Where another diagnosis has been coded as the most responsible and also a Type 2, and a diagnosis of Acute Myocardial Infarction, although not the most responsible, is coded as a Type 1 (pre-admit comorbidity)

2. Discharge between April 1, and March 3 of the following year (period of case selection ends March 1 to allow for 28 days of follow-up)
3. Age at admission between 15 and 84 years
4. Gender recorded as male or female
5. Admission to an acute care institution
6. Length of stay of 3 or more consecutive days

Exclusion Criteria:

7. Records with an invalid Health Card Number
8. Discharged as a death or self sign-out
9. Any one of the following ICD-9 diagnoses recorded in any position:

- Cancer (140-172, 174-208, V58.1, V58.0)
- HIV (042, 043, 044, V08)
- Trauma (E800-E848, E881-E884.1,E884.9, E886.0, E890-E899, E900-E910, E913-E926, E928, E950-E968, E970-E976, E990-E998)

Numerator

Inclusion Criteria:

The numerator is a subset of the denominator meeting the following conditions:

1. Readmission within 28 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital
3. Readmission for any one of the following conditions (ICD-9):

- Acute myocardial infarction (410)
- Other acute and subacute forms of ischemic heart disease (411)
- Old myocardial infarction (412)
- Angina pectoris (413)
- Other forms of chronic ischemic heart disease (414)
- Conduction disorders (426)
- Cardiac Dysrhythmias (427)
- Functional disturbances following cardiac surgery (429.4)
- Pneumococcal pneumonia (481)
- Other bacterial pneumonia (482)
- Bronchopneumonia, organism unspecified (485)
- Pneumonia, organism unspecified (486)
- Urinary tract infection (599.0)

Exclusion Criteria:

4. Any one of the following procedures and not also a suffix of '8'(cancelled procedure) or '9' (previous procedure) in association with the readmission hospitalization (CCP):

- Coronary Artery Bypass Graft (48.1)
- Angioplasty (48.02, 48.03, 48.04, 48.09)

- Angiography/catheterization (48.92, 48.93, 48.94, 48.95, 48.96, 48.97, 48.98, 49.95, 49.96, 49.97)
- Pacemaker Insertion (49.7, 49.81, 49.82, 49.83, 49.84, 49.88)

References:

Brown AD, Anderson GM. *Methods for measuring clinical utilization and outcomes*. In Baker GR, Anderson GM, Brown AD et al (eds.) *The Hospital Report '99*. Health Care Performance Measurement Group, University of Toronto, Toronto, 1999.

Dönges K, Schiele R, Gitt A, Wienbergen H, Schneider S, Zahn R, Grube R, Baumgärtel B, Glunz HG, Senges J. *Incidence, Determinants, and Clinical course of Re-infarction in-hospital after Index AMI*. Am J Cardiol 2001; 87:1039-1044.

Heller RF, Fisher JD, D'Estr CA, Lim LL-Y, Dobson AJ, Porter R. *Death and Readmission in the year after hospital admission with cardiovascular disease: the Hunter Area Heart and Stroke Register*. MJA 2000; 172:261-265.

Hosmer DW, Lemeshow S. *Confidence interval estimates of an index of quality performance based on logistic regression models*. Statistics in Medicine 1995; 14:2161-2172.

Hospital Report Acute Care 2001. Technical notes, Clinical Utilization and Outcomes. Canadian Institute for Health Information and the University of Toronto. A joint initiative of the Ontario Hospital Association and the Government of Ontario, 2001.

Maynard C, Every NA, Weaver WD. *Factors associated with re-hospitalization in patients with acute myocardial infarction*. Am J Cardiol 1997; 80:777-779

Ambulatory care sensitive conditions (ACSC)

Exclusions: Patients not treated as inpatients in acute care hospitals (e.g. those seen only in an emergency department or chronic care institution).

Numerator: number of ACSC in-patient separations from acute care hospitals (discharges and deaths) during the year, by age and gender categories

Denominator: population by age and gender categories, either from census or census estimates, for the year

Calculation: standardized rates are age-adjusted using a direct method of standardization based on the July 1, 1991 Canadian population

Source: Hospital Morbidity Database, CIHI. Census, Statistics Canada; ISQ

–Diagnosis Code(s): Based on the Alberta Health reference below, an ICD-9 or ICD-9-CM primary diagnosis code of:

250	Diabetes mellitus
291	Alcoholic psychoses
292	Drug psychoses
300	Neurotic disorders
303	Alcohol dependence syndrome

304	Drug dependence
305	Non-dependent abuse of drugs
311	Depressive disorder, not elsewhere classified
401	Essential hypertension
402	Hypertensive heart disease
403	Hypertensive renal disease
404	Hypertensive heart and renal disease
405	Secondary hypertension
493	Asthma

Calculation(s): Standardized rates are age adjusted using a direct method of standardization based on the July 1st, 1991 Canadian population as follows:

Age	Pop.	Age	Pop.
<1	403,061	45-49	1,674,153
1-4	1,550,285	50-54	1,339,902
5-9	1,953,045	55-59	1,238,441
10-14	1,913,115	60-64	1,190,217
15-19	1,926,090	65-69	1,084,588
20-24	2,109,452	70-74	834,024
25-29	2,529,239	75-79	622,221
30-34	2,598,289	80-84	382,303
35-39	2,344,872	85-89	192,410
40-44	2,138,891	90+	95,467

References:

Alberta Health. (1998, Dec). Health authority business plan and annual report requirements, 1999-2000 to 2001-2002, p.22. Edmonton, AB: Alberta Health

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Billings, J., Anderson.G.M., & Newman, L. S. (1996, Fall). Recent findings on preventable hospitalizations. Health Affairs, 15(3), p. 239-249.

Billings, J., Zeital, L., Lukomnik, J., Carey, T. S., Blank, A. E., & Newman, L. (1993, spring). Impact of socio-economic status on hospital use in New York City. Health Affairs, p. 162-173.

Brown, A.D., Goldacre, M.J., Hicks, N., Rourke, J.T., McMurtry, R.Y., Brown, J.D., Anderson, G.M. Hospitalization for ambulatory care-sensitive conditions: a method for comparative access and quality studies using routinely collected statistics. Canadian Journal of Public Health 2001; 92(2):155-160.

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http://www.umanitoba.ca/centers/mchpe/concept/dict/ACS_conditions.htm

Patient Satisfaction

Definition:	For each service area, the two following questions were asked: Overall how would you rate the quality of health care received? ... Excellent? Good? Fair? Poor? And, overall how satisfied were you with the way health care services were provided? Were you…Very satisfied? Somewhat satisfied? Neither satisfied nor dissatisfied? Somewhat dissatisfied? Very dissatisfied?
Exclusions:	The questions for this portion of the Canadian Community Health Survey target persons 15 years or older living in private dwellings in 10 provinces and 3 territories. Exclusions include persons in institutions, persons living on Indian Reserves or Crown lands, full-time members of the Canadian Armed Forces and residents of remote regions.
Numerator:	weighted number of individuals reporting excellent or very good in quality of each service and satisfied or somewhat satisfied with the service provided.
Denominator:	total Canadian population aged 15 and older who used health care services in past 12 months
Calculation:	(numerator/denominator) x 100
Source:	Canadian Community Health Survey Cycle 1.1 2000

APPENDIX B:
Rationale and Relevance
Notes for Interpretation

Self-reported health

Self-reported health is a general indicator of the overall health status of individuals. It can include what other measures may miss: beginning stages of disease, disease severity, some aspects of positive health status, physiological reserve, social and mental function.

Self-reported health data was collected using a five point reporting scale, ranging from excellent to poor. Studies indicate that when individuals rate their health in response to this question, they tap into information that has important predictive power relating to chronic disease incidence, functional decline and ultimately survival. Numerous longitudinal studies have found that self-reported health is predictive of mortality even when more objective measures such as clinical evaluations are taken into account. Inconsistencies between self-reported health data from population surveys and best estimates from epidemiological studies (under-reporting of undiagnosed conditions, over-reporting of some conditions, lack of information on condition severity) may explain why measures of self-reported health do not have credibility with all groups. This indicator applies to individuals 12 years old and older living in private households.

Life expectancy

Life expectancy is a widely used indicator of the health of a population. In developed countries, life expectancy is higher for women than for men, and is related to socio-economic factors such as poverty and education levels. The highest life expectancies in the world in 1999 were 84.1 in Japan for women, and 77.3 for men in Japan (Source: United Nations, Human Development Report 2001, page 210).

It should be noted that life expectancy is an indicator of the quantity rather than quality of life. Increases in life expectancy that are associated with increased prevalence of serious debilitating disease may not be judged to be as worthwhile as the same increase in life expectancy where the added years are lived in good health. In addition, many factors outside of the health system influence life expectancy and while this indicator is an effective measure of the health of the population variations are not necessarily reflective of the performance of the health system.

Life expectancy is a standardized statistical indicator for a population. It is not the number of years a particular newborn (or individual currently age 65) can actually expect to live. The reason is that only mortality rates for the observation period (e.g. 1998) are used, and these are averages for the entire population. Historically, mortality rates in Canada have been falling. As a result life expectancy estimates for the population are increasing. However, individuals' life circumstances vary. As a result, if an individual had been a long time smoker, or had a family history of disease, these factors could contribute to a shorter life for the individual.

Disability-free life expectancy

DFLE is an increasingly used indicator, and complements conventional life expectancy measures. It was developed to reflect the fact that not all years of a person's life are typically lived in perfect health. Chronic disease, frailty, and disability tend to become more prevalent at older ages, so that a population with a higher life expectancy may not be healthier.

Indeed, a major question with an aging population is whether increases in life expectancy will be associated with a greater or lesser proportion of the future population spending their years living with disability. If DFLE is increasing more rapidly than life expectancy in a population, then not only are people living longer, they are also living a greater portion of their lives free of disability.

While various thresholds are possible, disability here is specified as moderate and severe disability, plus living in an institution. Thus, anyone whose disabilities place them below that threshold is counted as disabled, and anyone else, even with some disability, is counted as not disabled.

Low birth weight

Low birth weight is an indicator of the general health of newborns, and a key determinant of infant survival, health and development. Low birth weight infants are at a greater risk of dying during the first year of life, and if they survive, they have a greater risk of disability and diseases such as cerebral palsy, visual problems, learning disabilities and respiratory problems. Low birth weight is associated with poor maternal health, lifestyle and economic circumstances. It is also associated with multiple births and assisted conception.

Appropriate medical care and a healthy lifestyle for the mother can improve the chances that the baby will have a healthy birth weight. It should be noted that a potentially confounding factor is variations in the ethnic composition of the population since some ethnic groups tend to have babies of lower weight, even though these infants are otherwise healthy.

The low birth weight rate in 1997 for 26 of 30 developed countries was 6.1% of live births, compared with 5.8% in Canada (OECD). Among developed countries, a low birth weight rate of less than 5.0 is considered good.

Over time, there has been improved reporting of live births <500 grams. In order to improve comparability in reporting on low birth weight, births under 500 grams are excluded. Births with unknown birth weights are also excluded from the calculation. These births are quite rare in Canada, representing less than 0.2% in any jurisdiction.

Historically there have been concerns with comparability of the data for this indicator in specific jurisdictions due to missing birth registrations or data quality problems. Many of these problems have been identified and efforts have been made to correct these (1993-1997). Any problems with comparability in later years will be noted with the release of these data.

Infant mortality

The infant mortality rate is a long-established measure of infant health and the well-being of a society. It reflects not only the level of mortality, but also the health status and health care of a population. A high infant mortality rate in a population can be a reflection of deficiencies of physical and socio-economic factors such as nutrition, socio-economic status, education or health care. The infant mortality rate is also related to maternal factors such as education level, age, and smoking. Factors outside of the health system influence infant mortality and while this indicator is an effective measure of the health of the population variations are not necessarily reflective of the performance of the health system.

The average infant mortality rate in 1997 for 29 of 30 developed countries was 7.3 infant deaths per 1,000 live births, compared with 5.5 per 1,000 in Canada (OECD). Among developed countries, an infant mortality rate of less than 4.0 per 1,000 is considered exceptionally good. Only Japan and Iceland had achieved such low rates by 1996.

One must consider international comparisons with caution, however, since differences in registration systems of infant mortality, including inconsistent inclusion of infants weighing less than 1000 grams and differences in the classification of births as live births or stillbirths, complicate international comparisons. For example, while the WHO recommends that international comparisons of infant mortality be restricted to live births, 1,000 grams and over, this has not become established practice. The Canadian rates of registration of live births under 500 grams are much higher than the rates observed in some OECD countries, but are not as high as in the U.S. (*Statistical Report on the Health of Canadians, 1999, p.306).*

Physical activity

Maintaining physical activity is associated with a range of health benefits. Many studies have shown that regular physical activity confers major heart health benefits and that inactivity is a major risk factor for heart disease. Recent evidence from the National Population Health Survey supports this conclusion, and also shows that physically active individuals are less likely to become depressed.

Youth smoking

Tobacco use is the leading cause of preventable illness and death in Canada. Health Canada estimates that smoking is responsible for more than 45,000 deaths per year. The indicator is the proportion of those aged 12-19 who report current smoking. Because of the addictive nature of nicotine, youth smoking is of particular concern. It is estimated that approximately eight out of every 10 people who try smoking become habitual smokers.

Exposure to environmental tobacco smoke

This indicator reflects the effectiveness of the public health system in protecting non-smokers against exposure to tobacco smoke in public spaces and work places.

The relationship between environmental tobacco smoke and adverse health effects is well accepted. Besides being a known mucous membrane irritant, second-hand smoke exposure is linked to increases in mortality from lung cancer and cardiovascular disease. Second-hand smoke also has serious consequences for children. Smoking mothers bear children with lower birth weights, and children living in homes where they are exposed to tobacco smoke have higher rates of asthma and respiratory tract problems. There is strong evidence of an association between exposure to environmental tobacco smoke and respiratory problems.

Body weight

Obesity has been identified as a major risk factor contributing to a number of chronic illnesses such as diabetes and heart disease. BMI is the most common method of determining if an individual's weight is in a healthy range. Data on height and weight are based on self-report survey responses. Individuals may not always report reliably. The effect of excess weight obesity as a risk factor for various diseases increases with BMI above the threshold of 25; this is a very widely used standard in the health literature.

Chlamydia

This is a common sexually transmitted disease which may result in female infertility and ectopic pregnancy. The higher incidence rates relative to other STDs are a more sensitive indicator of change in risk behaviours and reflect the effectiveness of primary and secondary prevention.

The new diagnostic test introduced around 1997 (nucleic acid amplification test or NAAT) initially accounted for some of the increase in incidence. However, since the incidence of Chlamydia and other sexually transmitted diseases has continued to increase, it can be assumed there actually are more cases now, and we are no longer seeing the effect of the new test.

HIV

The rate of decline of new HIV infections has slowed or perhaps reversed. Most infections are sexually transmitted. This can be considered an indicator of high-risk sexual behaviours.

The number of new HIV diagnoses is a function of both HIV incidence and HIV testing patterns.
The number of HIV test reports in a given year includes individuals infected in that year as well as individuals infected in previous years; most individuals will not be diagnosed in the year they are infected. In addition to changes in HIV incidence and testing patterns, the number of new diagnoses is also influenced by reporting delays and improved removal of duplicate reports. Thus, changes in the numbers/rates of reported positive tests must be interpreted with caution. Nevertheless, these numbers are useful in tracking the HIV epidemic.

Potential Years of Life Lost due to Unintentional Injury

The number of years of life potentially lost as a result of premature death (i.e., death prior to age 75) due to unintentional injuries measures the adequacy and effectiveness of injury prevention efforts, including public education, community and road design, prevention, emergency care, and treatment resources, compared to other regions, provinces, and countries.

Potential Years of Life Lost due to Suicide

PYLL due to suicide provides an overall indication of population health and social well-being, and highlights the effectiveness of the public and mental health programs in preventing premature death due to suicide. Lower rates reflect success in preventing premature loss of life, with its consequent loss to society in terms of social and economic reproductivity.

Measles

The Pan-American Health Organization adopted the goal of measles elimination by 2000; it is also the only national goal and objective that has been adopted by all provinces and territories. Two doses of measles vaccine are required for complete protection; the first dose is given at 12 months and the second dose prior to school entry, at either 18 months or 4-6 years of age. In the absence of global eradication, maintaining measles elimination requires ongoing, enhanced surveillance and continued high immunization coverage rates.

Haemophilus Influenzae b (Hib)

Hib was the most common cause of bacterial meningitis and a leading cause of other serious invasive infections in children prior to the introduction of Hib vaccines. Vaccine preventable cases are now rare. Four doses of the vaccine are given in combination with diphtheria, pertussis, tetanus, and polio before the age of 2 years. Other vaccines, which could potentially interfere with the immunogenicity of Hib vaccine, are being introduced (e.g. conjugate pneumococcal and meningococcal vaccines, and hepatitis B).

Invasive meningococcal

A new generation of very effective protein conjugate vaccines is now available against Group C disease which can be given to infants as young as two months of age. The National Advisory Committee on Immunization (NACI) recommends three doses of this vaccine at two, four and six months of age for routine immunization. Other meningococcal conjugate vaccines, which are anticipated to confer long-term immunity against multiple serogroups, are under development. Epidemiological data on invasive meningococcal disease will enable evidence-based program planning and evaluation.

There is a high level of public interest in this disease, as well as strong potential for significant reduction in incidence over time. Most cases of this disease occur in the 0-19 age group, and immunization programs generally focus on this group.

Tuberculosis

TB is an important public health problem that has become more prominent in recent years. Incidence is linked to high-risk groups such as recent immigrants, First Nations communities and people co-infected with HIV. Multiple drug resistance is also emerging as a problem.

Influenza for 65+

The indicator reports time of last immunization. Individuals aged 65 and over who have not been immunized in the past year are asked why not. Data are available from the CCHS for a subset of the sample, but will allow for estimates at provincial and national levels.

E.coli

This may be considered an approximate indicator of food-borne illness. It also has implications for water-borne disease issues. *E. coli* 0157 is included in the category of verotoxogenic *E. coli* (VTEC), accounting for more than 90% of cases. There is an intent that all jurisdictions should report VTEC in the future.

AMI mortality rate

Age-standardized AMI death rate trends may indicate long-term success in reducing deaths from these diseases, compared with other provinces and countries. Lower death rates indicate success in cardio-vascular disease prevention, detection, and treatment.

30-day in-hospital acute myocardial infraction

Acute myocardial infarction (AMI) is one of the leading causes of death in Canada. There are effective strategies for treating and preventing AMI. Thirty-day AMI inpatient mortality provides information associated with some aspects of treatment. The 30-day in-hospital mortality rate is highly correlated with total mortality during this period, following AMI. Reporting measures of 365-day survival and age-specific mortality rates help to provide a broader perspective on AMI treatment and prevention.
To enable comparison across regions, a statistical model was used to adjust for differences in age, sex and co-morbidity.

Stroke mortality rate

Age-standardized stroke death rate trends may indicate long-term success in reducing deaths from these diseases, compared with other provinces and countries. Lower death rates indicate success in cardio-vascular disease prevention, detection, and treatment.

30-day in-hospital stroke

Stroke is an important cause of death and disability in the Canadian population. The risk-adjusted mortality rate is an important measure of variations in mortality, which may be due to a number of factors, including emergency treatments, quality of care in hospitals, primary care and prevention, or socio-economic factors, for example. The mortality rate is an important indicator in comparing stroke outcomes between jurisdictions, and measurements over time may reflect advances in prevention and treatment and other factors.

Potential years of life lost due to AMI and Stroke

The most widely used indicator based on mortality rates is life expectancy. It measures *average* expectation of life, and therefore reflects both changing lengths of life for the very old, and changes in mortality rates for the non-elderly. PYLL is a complementary indicator focusing on mortality among the non-elderly. It reflects the level of success in preventing premature (and therefore presumably preventable or postponable) loss of life, with its consequent loss of social and economic productivity. It is an overall indicator of population health and well-being, and effectiveness of preventive programs.

It should be noted that, at old ages, co-morbidity becomes very frequent and death is often the result of a complex process. This can make PYLL more meaningful for diseases that can be identified as the sole cause of death and for those that kill at an early age. Unfortunately, PYLL is only based on single causes of death statistics.

Incidence rates for breast, prostate, colorectal and lung cancer

Age-standardized incidence rates measure the appearance of new cancers. This incidence rate is influenced by two main groups of factors: (1) the underlying rate of cancer incidence, which in turn reflects, in part, the prevalence of risk factors such as smoking, and hence the success of primary prevention efforts, and (2) the rate of detection and diagnosis of cancers, which in turn can be influenced by the intensity and effectiveness of cancer screening programs.

Unfortunately from the viewpoint of interpreting this indicator, these two factors work in opposite directions. For example, an increase in measured cancer incidence could reflect either a deterioration in healthy life style or an improvement in screening. However, this latter kind of "screening artifact" is unlikely to carry on for a long period of time so that generally, a declining incidence of cancer suggests a positive change in population health. This interpretation issue is being addressed by the addition of staging data to the cancer registry systems. Cancer staging provides information on how advanced (serious) the cancer is at the time of diagnosis.

As a general comment on using incidence figures, there is an increasing awareness that a successful decrease in one disease may simply lead to an increase in the incidence of some other conditions, with no net benefit. Therefore, when one cause of death or disability is replaced by another, it is important to know if there is a net increase in life span or if there is a significant gap in time between the decrease in mortality for one cause and the increased mortality for another. Moreover, the quality of health during the remaining years is also crucial. Aggregated measures of health such as PYLL and DFLE help to address this issue.

Potential years of life lost for breast, prostate, colorectal and lung cancer

The most widely used indicator based on mortality rates is life expectancy. It measures *average* expectation of life, and therefore reflects both changing lengths of life for the very old, and changes in mortality rates for the non-elderly. PYLL is a complementary indicator focusing on mortality among the non-elderly. It reflects the level of success in preventing premature (and therefore presumably preventable or postponable) loss of life, with its consequent loss of social and economic productivity. It is an overall indicator of population health and well-being, and effectiveness of preventive programs.

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Mortality rates for breast, prostate, colorectal and lung cancer

Age-standardized cancer death rate trends may indicate long-term success in reducing deaths from these diseases, compared with other provinces and countries. Lower death rates indicate success in cancer prevention, detection, and treatment.

Relative survival rates for breast, prostate, colorectal and lung cancer

Relative survival is the most widely used method for analysing the survival of cancer patients in population studies. It reflects the added likelihood of mortality of those diagnosed with cancer.

Age-standardization controls for a bias that may be introduced by comparing relative survival estimates amongst provinces with different case age distributions.

The relative survival rate is influenced by two distinct groups of factors: (1) the severity (stage) of the cancer at the time of diagnosis, and (2) the effectiveness of cancer treatment after diagnosis. While the indicator does not shed light on the relative importance of these two kinds of factors, from the viewpoint of interpreting this indicator, these two factors work in the same direction. For example, an improvement in screening would result in cancers being detected at an earlier stage, where treatments are generally more successful, resulting in better observed survival. And if there had not been a significant change in screening, better observed survival would indicate more effective and successful cancer treatment after diagnosis. This interpretation issue is currently being addressed by the addition of staging data to the cancer registry systems. Cancer staging data indicates how advanced (serious) the cancer is at the time of diagnosis.

Prostate, breast, lung and colorectal cancer are reported on because they represent the four most common cancer sites. In particular, lung cancer relative survival rates are reported to inform the public of the poor prognosis of this cancer. The fact that health system interventions with lung cancer are not very successful underscores the need to emphasize preventive strategies.

It should be noted that variations in the use of prostate cancer screening (prostate specific antigen or PSA testing) have affected incidence rates of prostate cancer over the past ten years, and this may have an impact on survival rates. At the same time, however, available survival data are from 1992, just at the beginning of widespread PSA testing.

Hip and Knee replacement rate

The intended outcome of most elective surgery is improved health-related quality of life. Recent research in BC specifically examined the appropriateness and health-related outcomes of several types of elective surgery; over 6200 surgical episodes were assessed. Results demonstrated that health-related quality of life improved substantially for the great majority of those receiving one of six different elective procedures. Over 94% of those receiving a hip replacement reported significant improvement in pain, stiffness and overall functioning, as reflected in SF-36 and WOMAC results.

Due to limitations of existing databases, intervention rates for joint replacement are being used as surrogate indicators of health-related quality of life for reporting in 2002

Home care Admissions (All and Age 75 years + only)

In recent years, governments have supported programs to deliver some health services to people in their homes, as an alternative to admitting people to acute care or long term care facilities. This trend has certain benefits, for example: people needing care are more comfortable, and their life styles and independence are maintained for as long as possible; facility space can be reserved for those with greater health care needs; lower costs are often associated with home care, compared to care in institutions.

As more home care programs are implemented, it is expected that these services will be provided to increasing numbers of people. The indicators proposed here can show progress in the implementation of these programs, as long as there are remaining health needs which can be met through home care programs. At some point, however, home care programs may meet all the needs that can be addressed through such services; volume measures by themselves cannot show when all the health service needs are being met nor can they show how well these needs are being met.

Trends in home care volumes may be compared with trends in utilization of facility-based services (such as acute care admissions) to illustrate that increased availability of high quality home care can reduce hospital utilization. High quality home care services would be expected to reduce the need for acute care admissions or emergency care for people with certain chronic health conditions [see Indicator 12d, ambulatory care sensitive conditions], and to delay or prevent the need for long-term facility care. For example, as home care use among the elderly increases, there should be a corresponding decrease in waiting for long-term care space and an increase in the acuity of long-term care residents. Reporting data on these expected impacts of home care programs along with these volume indicators provides an indirect way of gauging the quality of these programs.

Wait times for cardiac surgery

Jurisdictions will report, to the extent possible, on: the number of months to clear the current wait list for CABG; the median wait in days for CABG surgery and, the distribution of CABG wait times.

Wait times for hip and knee replacement surgery

Jurisdictions will report, to the extent possible, on the following indicators: number of months to clear the current wait lists for total hip and total knee replacement surgery; median wait in weeks for total hip and total knee replacement surgery and, distribution of wait times for total hip and total knee replacement surgery.

Reported median wait time for (a) specialist physician visits, (b) diagnostic services, and (c) surgery.

Wait time refers to the length of time, in weeks, between the patient being referred for a specialized service and receiving the service, during the 12 months prior to the survey. The median is the 50th percentile of the distribution of wait times: half the patients wait less and half wait longer than the median number of weeks. Patients who have not yet received the service are excluded from the indicator calculation.

Note: specialist physician visits include visits for a new illness or condition only; diagnostic tests include non-emergency MRIs, CT Scans and angiographies only; surgery includes only non-emergency cases.

Distribution of reported wait times for (a) specialist physician visits, (b) diagnostic services, and (c) surgery.

Wait time refers to the length of time, in weeks, between the patient being referred for a specialized service and receiving the service.

The indicator is the percent of those requiring a specialized health service that waited less than 1 month, between 2 to 3 months or more than 3 months to receive the service, during the 12 months prior to the survey. Patients who have not yet received the service are excluded from the indicator calculation.

Note: Jurisdictions may also choose to report on the total number of persons who were waiting, expressed as an age-standardized rate per 1,000 population, as of November 2001.The per capita rate indicates the total size of the waiting list as well as the rate per capita of those who waited in each of the three wait time categories.

Access to Services: Routine Health care

The ability to obtain routine care when needed is believed to be important in maintaining health, preventing health emergencies and preventing the inappropriate use of services (e.g., use of hospital emergency rooms for non-emergencies).

Access to Services: Health information or advice

Access to information or advice is believed to be important to maintaining health and ensuring appropriate access to health services.

Access to Services: Immediate care

The ability to obtain needed care for emergent but minor health problems is believed to be important in restoring health, preventing health emergencies, and preventing the inappropriate use of services (e.g., use of hospital emergency rooms for non-emergencies).

Access to Services: Regular Family Doctor

Establishing an ongoing relationship with a family doctor is believed to be important in maintaining health and ensuring appropriate access to health services.

Readmission for Pneumonia & AMI

Hospital readmission rates for selected conditions can provide one measure of the quality of care. Many factors may be related to hospital readmission for a related condition, for example: medication prescribed at initial discharge from hospital, patient compliance with directions, the quality of follow-up care in the community, and the quality and completeness of care during initial hospitalization. Some of these factors are directly related to care at the hospital while others relate to the availability of appropriate services in the community or to patient factors. Higher than normal readmission rates should lead health service managers to examine any of the following: practices in hospitals (e.g., early discharge criteria), the availability of appropriate community services, coordination between hospital and community providers, and patient education and instruction.

Hospitalization rate for ambulatory care sensitive conditions

Age standardized in-patient acute care hospitalization rate for conditions where appropriate ambulatory care may prevent or reduce the need for admission to hospital.

Hospitalization rates for conditions, which may often be cared for in the community are one indicator of appropriate access to community-based care. These are long-term health conditions, which can often be managed with timely and effective treatment in the community, without hospitalization. These conditions include diabetes, asthma, alcohol and drug dependence and abuse, neuroses, depression, hypertensive disease, and others. Although preventive care, primary care, and community based management of these conditions will not eliminate all hospitalizations, such steps could eliminate many of them.

Health care professionals generally believe that managing these conditions before a patient requires hospitalization improves the patient's health, contributes to better overall community health status, and often saves money because community-based care usually costs less than hospitalization. Optimizing the management and treatment of these conditions will contribute to both improved patient health outcomes and more efficient resource utilization.

The hospitalization rates for these conditions tend to vary from place to place; for example, there are large rural/urban differences. One factor influencing the variation in rates is likely to be the extent to which preventive care and management within the community are available and accessible. Tracking hospitalization rates for these conditions over time can provide an indicator of the impact of community and home based services.

Variations over time, and differences between regions, should be examined to determine the extent to which they are attributable to the accessibility and quality of

community-based care, hospital admitting practices or the prevalence and acuity of these chronic health conditions.

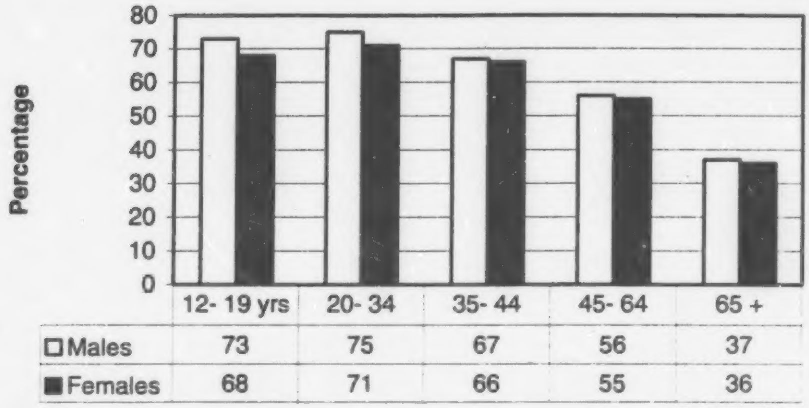
Patient Satisfaction

These indicators apply to individuals who have received health care services over a 12-month reference period. The individual's assessment of the quality of care received and the satisfaction with the services are measured. The indicators apply to individuals 15 years old and older living in private households.

APPENDIX C: Additional Graphs

Figure I

Persons 12 + years reporting excellent or very good health by age and sex, Canada, 2000-01

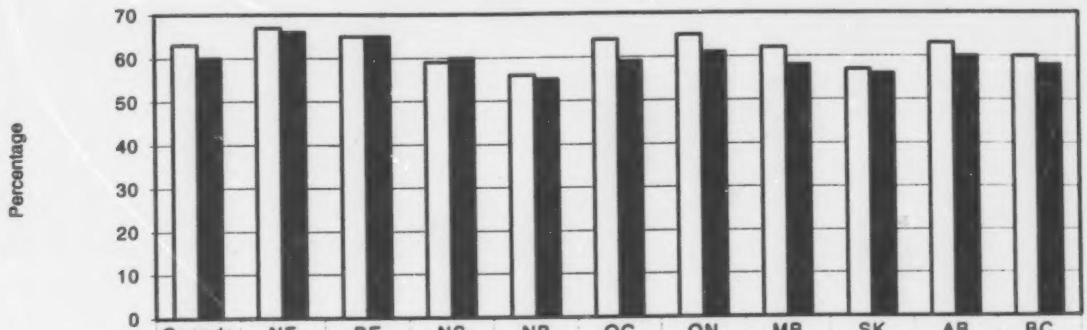


	12- 19 yrs	20- 34	35- 44	45- 64	65 +
☐ Males	73	75	67	56	37
■ Females	68	71	66	55	36

Source: Canadian Community Health Survey- Cycle 1.1 - 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

Figure II

Persons 12+ years reporting excellent or very good health by sex, Canada and provinces, 2000-01

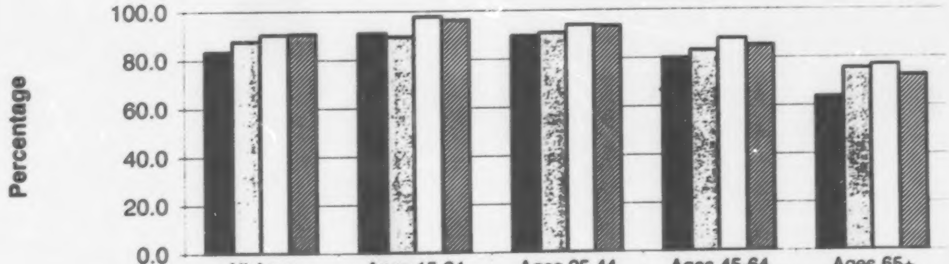


	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
☐ Males	63	67	65	59	56	64	65	62	57	63	60
■ Females	60	66	65	60	55	59	61	58	56	60	58

Source: Canadian Community Health Survey- Cycle 1.1 - 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

Figure III

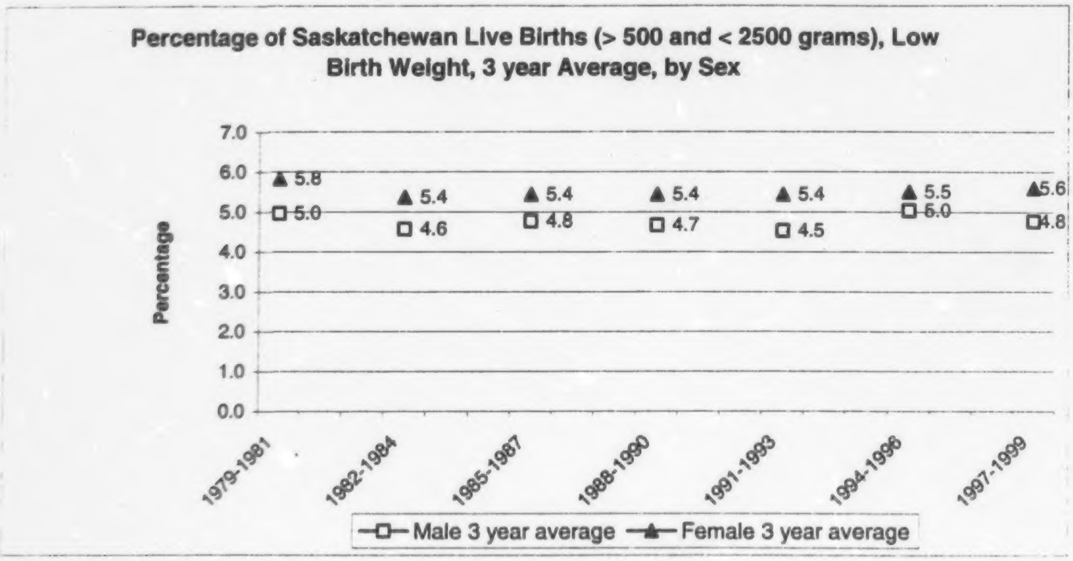
Percentage of the population rating their health as 'good' or better by age group, selected countries, latest year



	All Ages	Ages 15-24	Ages 25-44	Ages 45-64	Ages 65+
■ Australia	83.5	91.1	89.6	80.0	63.9
☐ New Zealand	87.8	89.6	90.8	83.2	75.6
☐ Canada	90.4	97.7	93.9	88.0	77.0
▨ USA	90.7	96.3	93.6	85.3	72.7

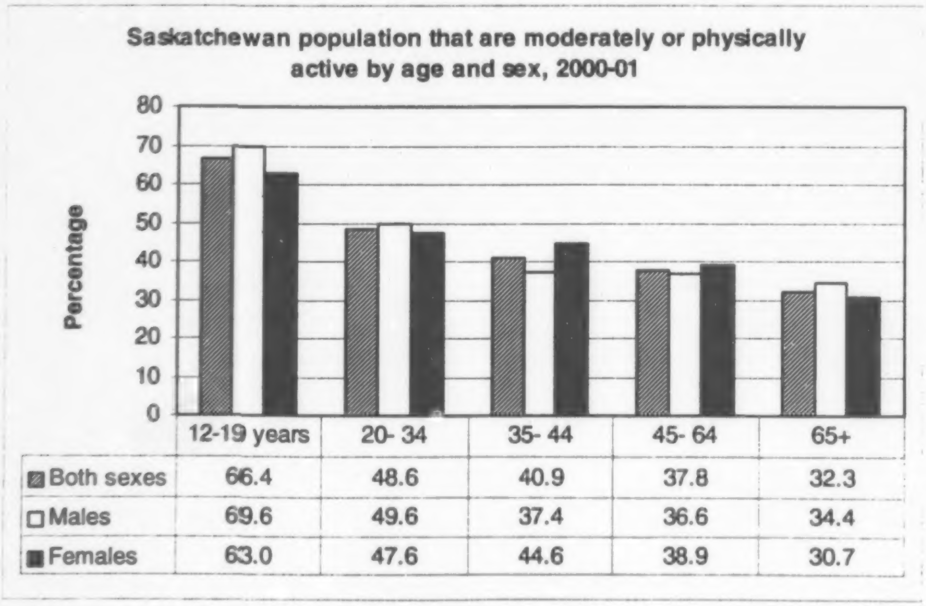
Source: Canadian Community Health Survey- Cycle 1.1 - 2000/2001; National Population Health Surveys (1994-1995 to 1998-1999).

Figure IV



Source: Statistics Canada, Vital Statistics, Birth database.

Figure V

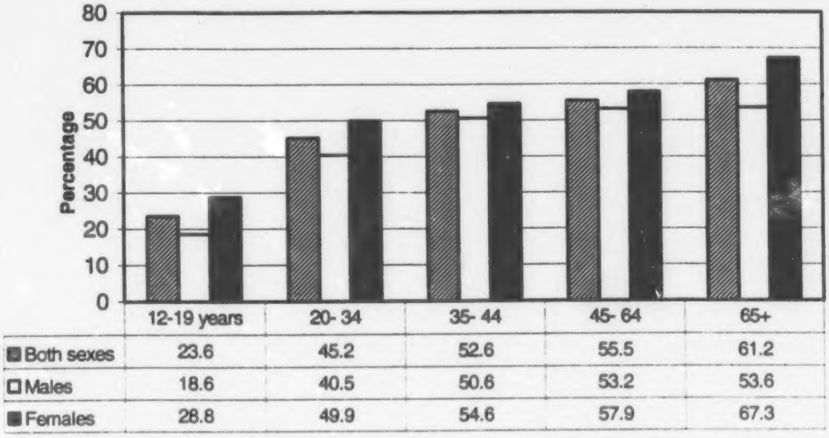


	12-19 years	20- 34	35- 44	45- 64	65+
▨ Both sexes	66.4	48.6	40.9	37.8	32.3
☐ Males	69.6	49.6	37.4	36.6	34.4
■ Females	63.0	47.6	44.6	38.9	30.7

Source: Canadian Community Health Survey - Cycle 1.1 2000.

Figure VI

Saskatchewan population that is physically inactive by age and sex, 2000-01

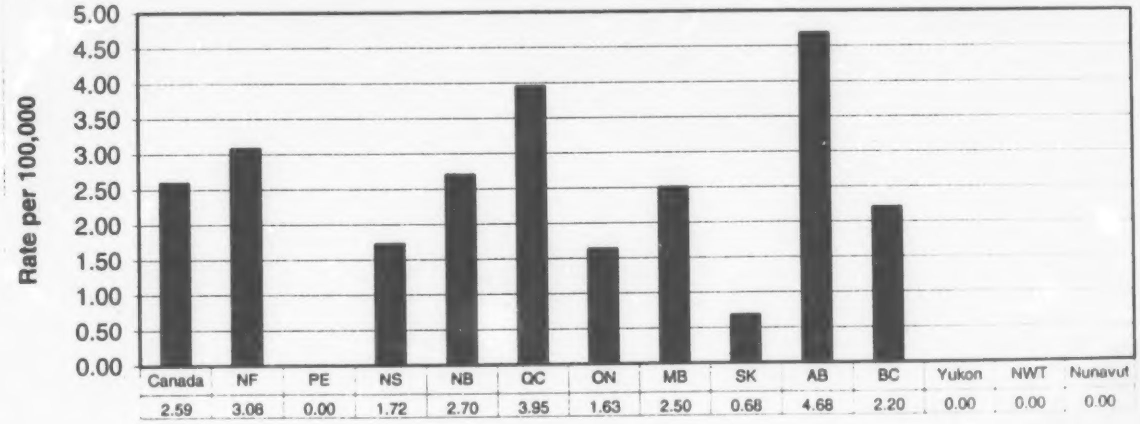


	12-19 years	20- 34	35- 44	45- 64	65+
▨ Both sexes	23.6	45.2	52.6	55.5	61.2
☐ Males	18.6	40.5	50.6	53.2	53.6
■ Females	28.8	49.9	54.6	57.9	67.3

Source: Canadian Community Health Survey - Cycle 1.1 2000.

Figure VII

Invasive meningococcal total incidence rate, Canada, provinces and territories, 2001

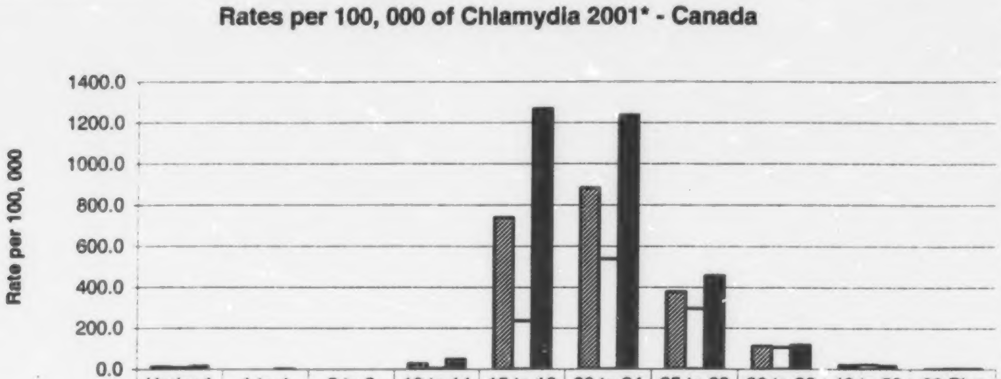


Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
2.59	3.06	0.00	1.72	2.70	3.95	1.63	2.50	0.68	4.68	2.20	0.00	0.00	0.00

Source: Provincial and Territorial Ministries of Health.

__Note:__ All data for 2001 are provisional. Prince Edward Island, the Yukon Territory, the Northwest Territories and Nunavut are all likely to be affected by small underlying sample sizes therefore caution is warranted in interpretation.

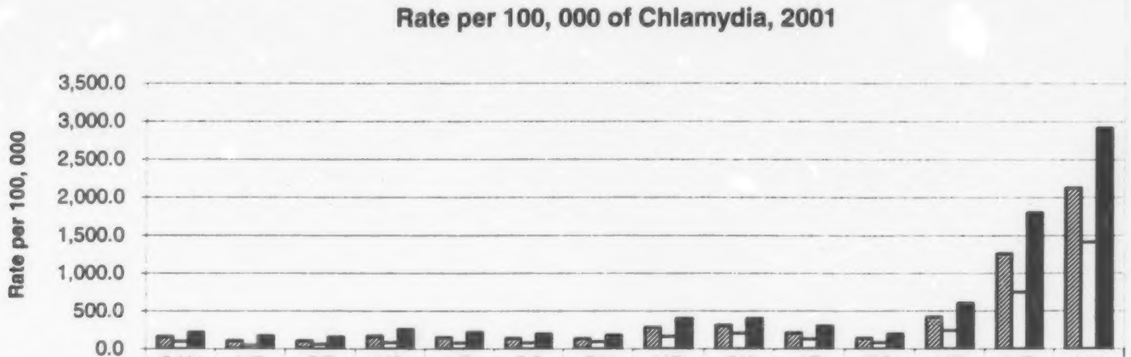
Figure VIII



	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40 to 59	60 Plus
▨ Both	12.4	0.4	0.1	26.6	738.5	881.8	376.5	112.4	19.3	1.6
☐ Males	9.0	0.0	0.0	3.7	236.4	538.2	297.1	106.6	21.5	2.3
■ Females	15.9	0.7	0.3	48.6	1266.8	1236.2	456.5	118.1	17.1	1.1

Note: All data for 2001 are provisional.

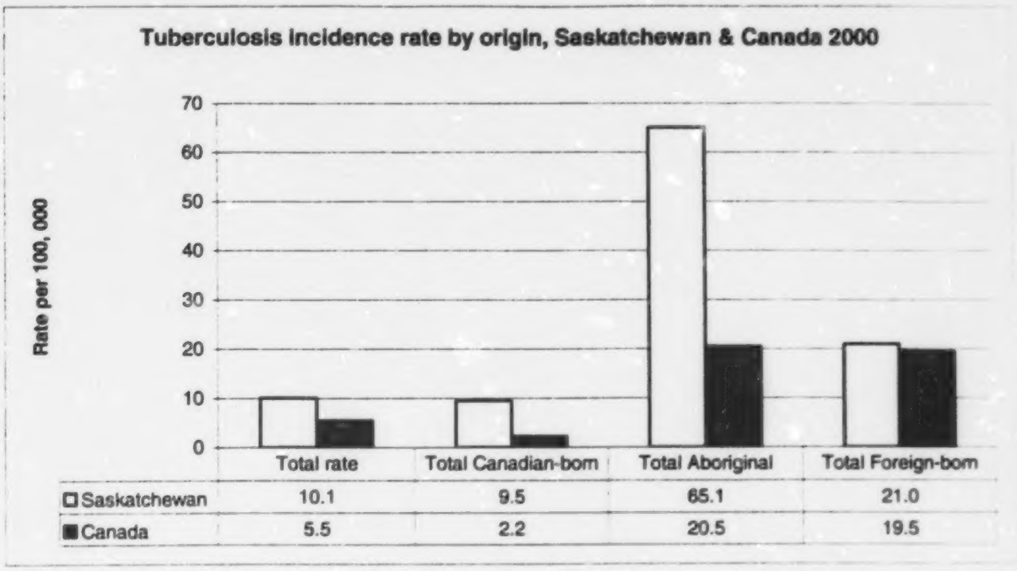
Figure IX



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	161.0	111.2	107.6	171.9	150.3	138.4	137.3	283.0	310.3	213.3	140.7	421.5	1,259.6	2,129.5
☐ Males	99.1	47.8	59.8	81.7	79.8	79.1	93.3	162.4	208.6	127.5	83.2	243.1	748.8	1,409.6
■ Females	221.0	173.3	153.8	258.3	219.0	195.5	180.1	401.9	397.5	300.8	197.3	601.1	1,800.8	2,918.2

Note: All data for 2001 are provisional.

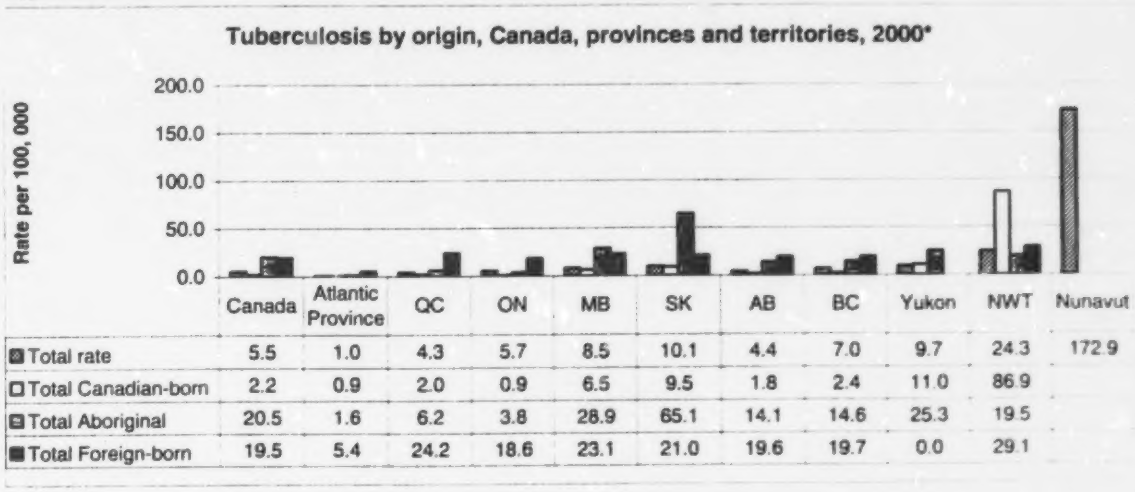
Figure X



	Total rate	Total Canadian-born	Total Aboriginal	Total Foreign-born
☐ Saskatchewan	10.1	9.5	65.1	21.0
■ Canada	5.5	2.2	20.5	19.5

Note: All data for 2000 are provisional.

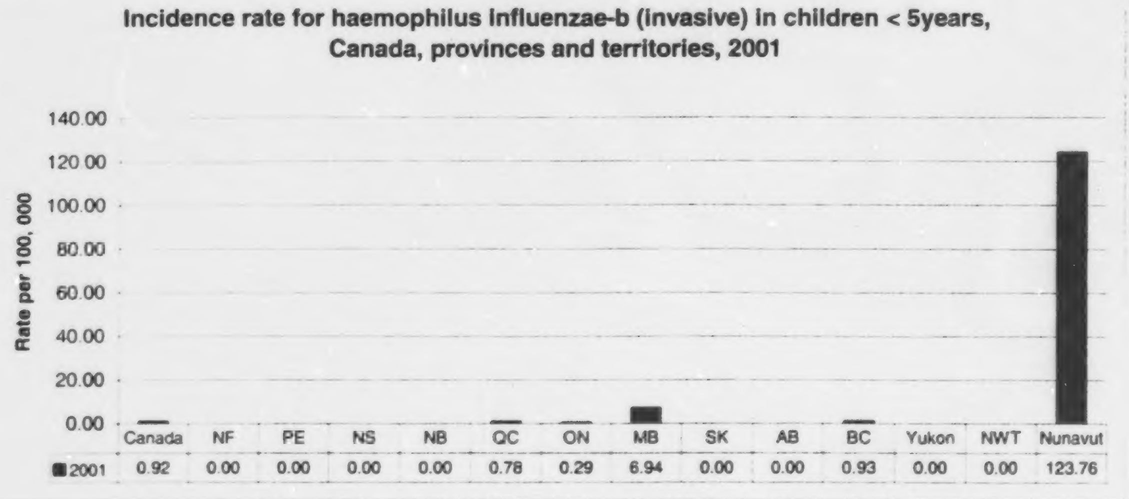
Figure XI



	Canada	Atlantic Province	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
▨ Total rate	5.5	1.0	4.3	5.7	8.5	10.1	4.4	7.0	9.7	24.3	172.9
☐ Total Canadian-born	2.2	0.9	2.0	0.9	6.5	9.5	1.8	2.4	11.0	86.9	
⊟ Total Aboriginal	20.5	1.6	6.2	3.8	28.9	65.1	14.1	14.6	25.3	19.5	
■ Total Foreign-born	19.5	5.4	24.2	18.6	23.1	21.0	19.6	19.7	0.0	29.1	

Note: All data for 2000 are provisional. Data for Nunavut are combined with NWT, with the exception of the 'Total Rate' where separate estimates for Nunavut and NWT are available.

Figure XII



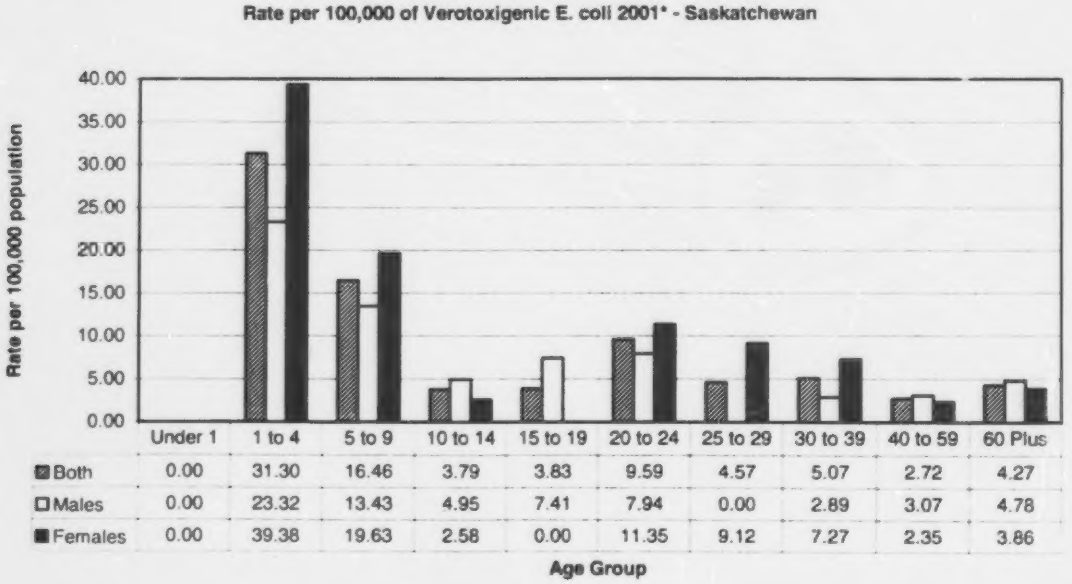
Incidence rate for haemophilus influenzae-b (invasive) in children < 5years, Canada, provinces and territories, 2001

	Canada	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	Yukon	NWT	Nunavut
■ 2001	0.92	0.00	0.00	0.00	0.00	0.78	0.29	6.94	0.00	0.00	0.93	0.00	0.00	123.76

Source: Provincial and territorial Ministries of Health, Notifiable Disease Reporting System Enhanced Surveillance System.

Note: All data for 2001 are provisional.

Figure XIII

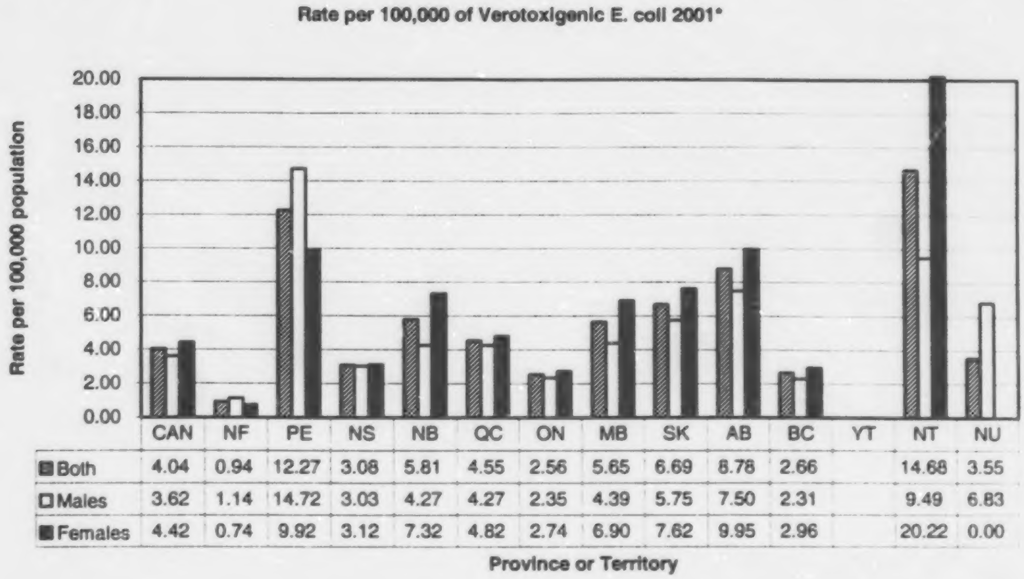


Rate per 100,000 of Verotoxigenic E. coli 2001* - Saskatchewan

	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40 to 59	60 Plus
▨ Both	0.00	31.30	16.46	3.79	3.83	9.59	4.57	5.07	2.72	4.27
☐ Males	0.00	23.32	13.43	4.95	7.41	7.94	0.00	2.89	3.07	4.78
■ Females	0.00	39.38	19.63	2.58	0.00	11.35	9.12	7.27	2.35	3.86

***Note:** Data for 2001 are preliminary and subject to change

Figure XIV



	CAN	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU
▨ Both	4.04	0.94	12.27	3.08	5.81	4.55	2.56	5.65	6.69	8.78	2.66		14.68	3.55
☐ Males	3.62	1.14	14.72	3.03	4.27	4.27	2.35	4.39	5.75	7.50	2.31		9.49	6.83
■ Females	4.42	0.74	9.92	3.12	7.32	4.82	2.74	6.90	7.62	9.95	2.96		20.22	0.00

***Note:** Data for 2001 are preliminary and subject to change. No data is provided for the Yukon Territory in 2001.

APPENDIX D: Notes on Indicators Not Included

Prevalence of diabetes

Rationale for non-inclusion

Although the prevalence of diabetes is widely used in public health monitoring and planning, and prevalence estimates are an important indicator of the burden placed on society by this disease, data for the prevalence of diabetes in Saskatchewan are not presented here.

The prevalence estimates that were provided for presentation are based on data from the National Diabetes Surveillance System (NDSS), which is currently in the early stages of implementation. Due to the relative infancy of this system of identifying diabetes in the population several concerns were raised about the adequacy of the data. Furthermore, issues surrounding the case definition of diabetes also introduced some question as to the ability of the data to be used for time trend analysis. The data sources used for case identification are all administrative in origin (health insurance registry file, hospital discharge data, and physician billing data) and rest on the assumption that the physician billing system captures the diagnosis information, and that all doctors' services are similarly contained within the billing system.

Validation work is also needed with reference to the use of registry data as a population base. There is some evidence that the insurance records of those people that die or migrate to other jurisdictions are not updated to reflect their status and therefore it remains possible that using health insurance registry files leads to an inflated estimate of the population.

Limitations in making Provincial Comparisons
Since each province and territory has its own collection and data management protocols it is conceivable that differences between provinces and territories could be partially attributable to different collection practices rather than to substantial differences in the prevalence of diabetes on a regional basis. Furthermore, data is not forthcoming from all provinces.

Limitations in trend analysis
The data was also limited in time frame. The most recent years of data (1989/99, 1999/2000) were restricted by the availability of administrative data sources. Trend analyses were also not recommended as there is evidence that the prevalence of diabetes is underestimated for the first few years of data due to a 'run-in' period. Therefore, in the early years of the data, comparing one year to another may incorrectly lead to the conclusion that there is a significantly larger increase than in reality.

Further Limitations

Current NDSS definitions of diabetes do not differentiate between type 1, type 2 and gestational diabetes. This can be of concern given that there are substantial clinical differences in the prevalence, severity and treatment of these conditions.

The use of this method for identifying the prevalence of diabetes has also not been validated for persons younger than 20 years of age. Given that juvenile-onset diabetes (Type I, Insulin-dependent diabetes mellitus) is predominantly diagnosed in childhood or adolescence, the prevalence of this type of diabetes is likely to be underestimated in current NDSS reporting.

Conclusion

The decision to not include diabetes prevalence estimates in this report was based on concerns about the adequacy of the data provided. Furthermore, on a nationwide basis, diabetes data reporting is incomplete i.e. two provinces and two territories are not reporting. Inconsistencies in the sources of the reference population used by some of the participating provinces are also cause for concern, and updates of these populations are irregular.

This does not mean that the prevalence of diabetes is not an important indicator of public health and of great significance for health policy and planning implementation. On the contrary, the prevalence of diabetes in Saskatchewan remains a pertinent topic for research and dissemination, especially given the large Native Indian population in the province, in which the disease rates (predominantly non-insulin dependent diabetes mellitus (Type 2)), are comparatively higher than in non-Native populations.

Good quality provincial level data exists within Saskatchewan that has recently been used by the Institute of Health Economics to develop projection models that highlight trends and subsequent costs of diabetes to the province. Given the implications of these rising costs of diabetes in the province, in terms of increased cardiovascular comorbidity and hospitalization, Saskatchewan remains committed to developing strategies to prevent, and alleviate the burden placed on society by this disease.

Given the underlined data limitations related to the infancy of the NDSS, however, the decision to not report diabetes prevalence for the province was taken.

Remaining Indicator Limitations

The rationale for not including the following remaining indicators is based on some general limitations with respect to the availability of data, and concerns about data quality. In each case, either the data was not forthcoming within a timeframe appropriate for inclusion within the current report, or there were outstanding issues surrounding the validity and reliability of the data to be used for analysis. The following indicators were, therefore, not included for the above reasons:

- 365-Day Survival Rate for AMI
- 180-Day Survival Rate for Stroke
- Waiting for Radiation Therapy (Breast and Prostate cancer)
- Utilization Rates for Home care

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